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CANCER OF THE CERVIX UTERI: SYDNEY HOSPITAL FIGURES FOR FIFTEEN, TEN AND FIVE YEAR PERIODS FROM 1929 TO 1943.

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THE presentation of the results of treatment in cases of cancer of the *cervix uteri* at the Sydney Hospital over a period to cover 1929 to 1943 is given as simply as possible; but a few explanatory comments are necessary to give a true picture of these figures. Also with this aim a very brief outline of technique and dosage employed is given.

Only cases in which treatment was by means of radium, deep X-ray therapy or a combination of both are given, and all cases in which insufficient dosage was received according to international standards have been discarded. Every case in this series has been proven histologically and many also by post-mortem examination, which included microscopic examination. A number have been excluded because, in spite of a typical clinical picture, no pathological report was available. In this group of exclusions there are some eighteen-year to twenty-year cases.

No case of cancer of a residual cervix has been included. All cases have been accurately staged according to the "League of Nations Health Organisation Atlas" (illustrating the division of cancer of the uterine cervix into four stages according to the anatomo-clinical extent of the growth), drawn up by Heyman and Strandquist and published by P. A. Norstedt and Soner, of Stockholm, in 1938. One person, in collaboration with the honorary medical officers concerned, was responsible for this classification over the whole period. All those cases in which treatment was carried out before the League of Nations booklet was published have been reclassified according to its requirements; and this has been possible only because the making of an accurate and careful clinical description, with diagrams and sketches in most cases, has been the routine practice in this hospital.

Technique.

Prior to 1933 the radium used in the vagina was mounted in two corks, each two centimetres in diameter, or in flat rectangles of rubber, 3·0 × 2·0 × 0·5 centimetres or 2·0 × 1·5 × 0·5 centimetres. The last two mentioned applicators were sutured in position. A central linear source of radium was placed in the cervical and uterine canal to cover its whole length.

From 1933 to 1938 the radium used in the vagina was applied in two holders: (*a*) one for each lateral fornix and (*b*) one for the central cervical area (see Figure I).

The applicator for each lateral fornix was an arrangement of two thick rubber cylinders, each one centimetre in diameter, and of two lengths, 1·5 centimetres or 2·5 centimetres. These two cylinders were attached to one another by a thick, rubber-covered, U-shaped piece of copper wire, which projected down the centre of the vagina when the apparatus was *in situ*. Each held one ten-milligramme tube and treated at a distance of 0·5 centimetre.

The applicator for the central cervical area was a rubber "plaque" of two sizes, either 3·5 × 2·5 × 0·75 or 2·5 × 2·0 × 0·75

centimetres. The larger one held three long ten-milligramme tubes and the smaller one held two short ten-milligramme tubes, all tubes being one centimetre apart and treating at a distance of 0·5 centimetre when made up for use. (A "long" tube is one of 25 millimetres' total length and 18 millimetres' active length. A "short" tube is one of 21 millimetres' total length and 10 millimetres' active length. All the tubes have a filter of two millimetres of platinum.)

Central tubes were placed, as a linear source, in the cervical canal and uterine cavity.

From 1938 onwards the Manchester Radium Institute ovoids and spacer have been used for the vagina with

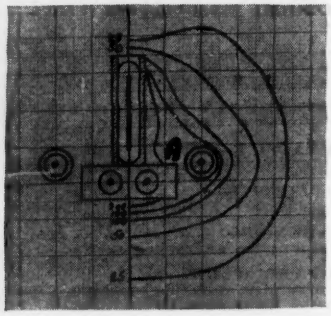

FIGURE I.

Isodose curves. Figures give dosage rates in *r* per hour. Radium tubes used: 1 × 25 milligrammes (short) in tube; 2 × 10 milligrammes (short) in plaque; 2 × 10 milligrammes (long) in colpostat. Scale 1 : 1.

the modification of enlarging the neck of the spacer to enable it to be bored to hold a short ten-milligramme tube and thus using three ten-milligramme tubes in the vagina (see Figure II). One, two, three or very rarely four ten-milligramme tubes were used in the cervical canal and uterus, according to their length.

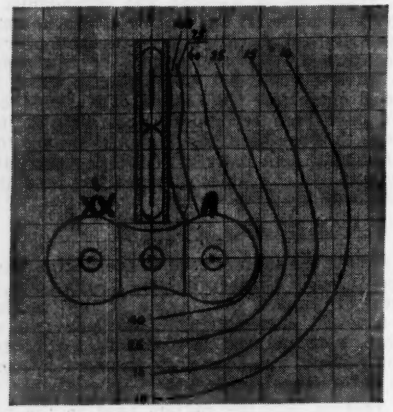

FIGURE II.

Isodose curves. Figures give dosage rates in *r* per hour. Radium tubes used: 1 × 10 milligrammes (short) + 1 × 10 milligrammes (long) in tube; 3 × 10 milligrammes (short) in medium balls and spacer. Scale 1 : 1.

The isodose curves for these arrangements are shown in Figures I and II, Figure I being that of the 1933-1938 disposition and Figure II that from 1938 onwards.

In the 1933-1938 group in some cases a twenty-five-milligramme tube was used at the distal end of the cervical and uterine tube. This arrangement was used only when insufficient ten-milligramme tubes were available. This strength tube has not been used since 1939.

From 1933 onwards a course of deep X-ray therapy applied to the whole pelvis was given as a routine procedure, being omitted in only a few cases, for some individual reason.

Dosage.

Until the end of 1938 the dosage was purely empirical and ranged from 5500 to 8000 milligramme-hours (being 7000 milligramme-hours in the great majority of cases), 50 to 75 milligrammes of radium being used over a period

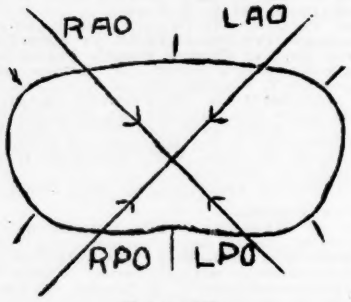

FIGURE III.

ranging from eighty to one hundred hours (and up to one hundred and twenty hours in a few cases) in one dose. A physicist to the department was appointed in 1939. He put the dosage on a reasonable physical basis, and he estimated the earlier dosages given by this method as ranging from 14,000*r* to 21,000*r* at point A (Figure I). In view of this it is extremely surprising that there was not a lot of trouble with excessive rectal reactions; but those were rare.

From the end of 1938, when the use of the Manchester applicators was instituted, the great majority of the patients were given a dose of 9000*r* at point X and 7200*r* at X′ (Figure II), X being a point 1·3 centimetres out from the distal, active end of the radium tube in the cervical canal and in the same horizontal plane as this end, and X′ being between 1·7 and 1·8 centimetres from the same point in the same plane. The lower and upper limits of dosage at these points were 5000*r* and 12,400*r* respectively.

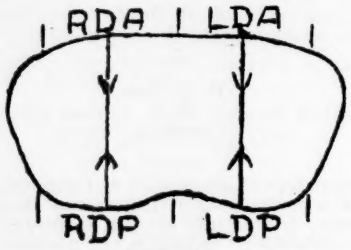

FIGURE IV.

The radium treatment was given in a split dose three weeks apart only when it was found impossible to introduce the applicator into the cervical canal at the first attempt. In the great majority of cases a course of deep X-ray therapy was given commencing from a few days to four weeks after the radium had been removed.

The deep X-ray treatment was given to four pelvic portals by one of two methods. In the first four oblique fields were used, namely, right and left anterior oblique and right and left posterior oblique, the central axis of each centering on the sagittal plane of the cervix and uterus, and the fields extending from the level of the introitus to the level of the iliac crests—or sometimes to the umbilicus if indications required—and from lateral

TABLE I.

Carcinoma of Cervix Uteri: Radiotherapy Department, Sydney Hospital, 1929 to 1943.

Observation.	1929 to 1933.			1934 to 1938.		1929 to 1938.	1939 to 1943.	1929 to 1943.
Number of patients examined with a view to treatment	52			157		209	117	326
Number refused or considered unfit for treatment	1			2		3	6	9
Number treated by surgery and irradiation	3			14		17	3	20
Number for whom pathological report not available or indicating benign condition	5			16		21	4	25
Number untraced	2			4		6	1	7
Total number of patients treated radiotherapeutically	41			121		162	103	265
Result (for Patients Treated Radiotherapeutically).	**Fifteen Years.**	**Ten Years.**	**Five Years.**	**Ten Years.**	**Five Years.**	**Ten Years.**	**Five Years.**	**Five Years.**
Alive and well	3	6	9	29	37	35	35	81
Alive with disease	0	0	0	0	4	0	0	4
Died due to intercurrent cause	5	2	1	7	3	9	1	5
Died of disease	33	33	31	85	77	118	67	175
Relative survival rate	7·3%	14·6%	21·9%	23·9%	33·9%	21·6%	33·98%	32·1%

wall to lateral wall of the bony pelvis (see Figure III). In the second method right and left direct antero-posterior and right and left direct postero-anterior fields were used with the same lower and upper levels (see Figure IV).

The dosage given to each field was usually 2600*r* to 2800*r*, the lower and upper limits being 2100*r* and 3200*r* respectively, one field being treated per day. The factors employed were 275 kilovolts (Villard circuit), five milliamperes, 60 centimetres focal-skin distance, and a half-value layer of either three millimetres of copper (a total filtration of three millimetres of copper *plus* two millimetres of aluminium) or 3·4 millimetres of copper (a total filtration of four millimetres of copper *plus* two millimetres of aluminium). The dosage was measured on the skin with backscatter.

TABLE II.

Fifteen-Year Results for Patients Treated Radiotherapeutically: 1929–1933.

Stage.	Number of Patients.	
	Treated.	Alive at End of Fifteen Years.
I, II, III and IV	41	3 (7·3%)

The depth dose at 10 centimetres, expressed as a percentage of the skin dose according to Mayneord and Lamerton's (1941) figures, was from 46% to 50%, varying with the field size, and for a half-value layer of between three and four millimetres of copper.

Most of the patients attended follow-up clinics regularly as required. Those residing in outlying districts are referred back to their local doctors for routine check-up. Every endeavour is made to obtain annual reports, and the percentage of patients untraced between 1929 and 1943 was approximately 2·0.

Statistics.

In the presentation of the accompanying statistical tables it has been our aim to provide a clear and concise analysis of our radiotherapeutic treatment results. For the fifteen years 1929-1943 inclusive, 265 cases were available from a total of 326 cases reported during the period. A discrepancy of 61 cases may require some explanation lest the results be deemed to be non-representative.

A total of 29 cases, as may be seen in Table I, were non-comparable. In an analysis of radiotherapeutic treatment results the necessity is evident for the exclusion of "untreated" or "surgically treated" patients, including those given insufficient dosage (see second paragraph). A further total of 25 cases were inevitably excluded owing—with the exception of those in which the condition subsequently proved to be benign—to lack of information; a factor not inexcusable considering that some of the records date back more than twenty years. Of the seven "untraced" patients, two were known to have left Australia and all were lost sight of in the first five years following treatment.

In each instance the survival rate has been assessed in complete calendar years commencing from the initial

TABLE III.

Ten-Year Results for Patients Treated Radiotherapeutically: 1929 to 1938.

Stage.	1929 to 1933. Number of Patients.		1934 to 1938. Number of Patients.		1929 to 1938. Number of Patients.	
	Treated.	Alive at End of Ten Years.	Treated.	Alive at End of Ten Years.	Treated.	Alive at End of Ten Years.
I.	5	2 (40·0%)	15	9 (60·0%)	20	11 (55·0%)
II.	19	3 (15·8%)	34	15 (44·1%)	53	18 (33·9%)
III.	13	1 (7·7%)	55	5 (9·1%)	68	6 (8·8%)
IV.	4	0	17	0	21	0
Total	41	6 (14·6%)	121	29 (23·9%)	162	35 (21·6%)

date of treatment. Deaths due to a cause, or causes, other than carcinoma of the *cervix uteri* have been differentiated only in Table I.

In considering the fifteen year results (Table II), it must be mentioned that five deaths (among the 41 patients) were due to a cause other than carcinoma. In addition in only five cases could the carcinoma be classified as stage I; in three of these death was not due to carcinoma. It must therefore be stressed that this table does not represent a true picture of the fifteen year survival rate for all stages of carcinoma of the *cervix uteri* treated radiotherapeutically. If the results were expressed as a fifteen year survival rate, stage I cases being excluded, there would be 36 patients treated with three alive for the period; a survival rate of 8·3% for stages II, III and IV only.

In the ten year and five year results for 1929-1933 (Tables III and IV), the deaths due to a cause other than carcinoma of the cervix numbered two and one respectively. This represents a possible loss of 4·8% and 2·4% in the survival rates shown.

In a comparison of the results for all patients treated with radium and deep X-ray therapy during the periods 1929-1933 (20%) and 1934-1938 (39·2%) it is worthy of note that in the latter period the survival rate increased by 19·2% in spite of the fact that there was a decrease of 4% in the number with stage I carcinoma treated according to this technique and an increase of 13% in the number with stage III carcinoma. The drop in the number with stage IV carcinoma (8%) would not appear to compensate this loss, and therefore it is probable that the improvement in technique accounts for the higher rate of survival.

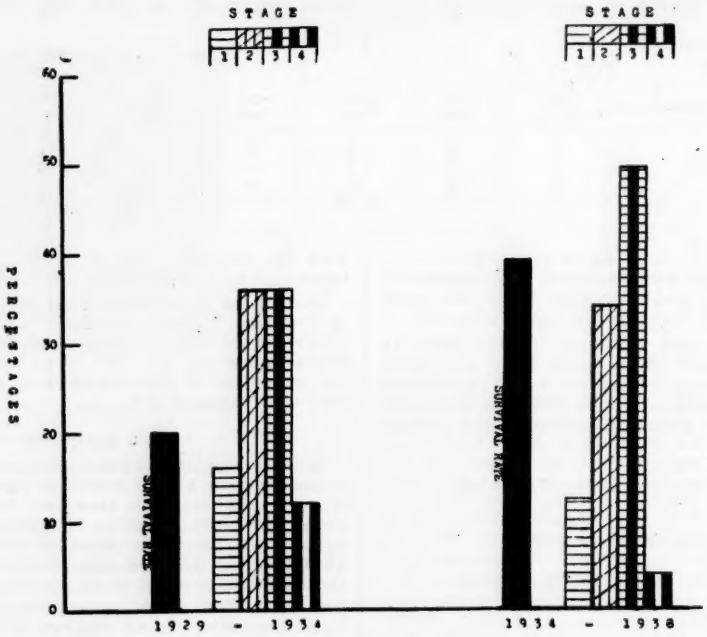

FIGURE V.

Five and ten year results in relation to stage (Tables V and VA): histogram.

Acknowledgements.

We are indebted to Mr. G. Rudinger, formerly physicist to the Sydney Hospital, for all the physical data of dosage in this paper and for the isodose curves of Figures I and II. For their invaluable assistance with the follow-up our

TABLE IV.

Five-Year Results for Patients Treated Radiotherapeutically: 1929 to 1943.

Stage.	1929 to 1933. Number of Patients.		1934 to 1938. Number of Patients.		1939 to 1943. Number of Patients.		1929 to 1943. Number of Patients.	
	Treated.	Alive at End of Five Years.	Treated.	Alive at End of Five Years.	Treated.	Alive at End of Five Years.	Treated.	Alive at End of Five Years.
I	5	3 (60·0%)	15	10 (66·7%)	12	7 (58·3%)	32	20 (62·5%)
II	19	4 (21·0%)	34	20 (58·8%)	43	18 (41·9%)	96	42 (43·7%)
III	13	2 (15·4%)	55	11 (20·0%)	33	9 (27·3%)	101	22 (21·8%)
IV	4	0	17	0	15	1 (6·6%)	36	1 (2·8%)
Total ..	41	9 (21·9%)	121	41 (33·9%)	103	35 (33·9%)	265	85 (32·1%)

thanks are due to many members of the medical profession for replying to 293 *questionnaires* and letters, to members of the Police Department for tracing patients outside the metropolitan area and to the Registrars-General of Sydney, Melbourne, Darwin and Auckland.

TABLE V.

Five-Year and Ten-Year Results for Radium and Deep X-Ray Therapy Technique.

Period.	Number of Patients.		
	Treated.	Alive at End of Five Years.	Alive at End of Ten Years.
1929 to 1933	25	5 (20·0%)	3 (12·0%)
1934 to 1938	97	38 (39·2%)	28 (28·9%)
1929 to 1938	122	43 (35·2%)	31 (25·4%)

TABLE Va.

Stage Distribution.

Period.	Stage.			
	I.	II.	III.	IV.
1929 to 1933 ..	4 (16·0%)	9 (36·0%)	9 (36·0%)	3 (12·0%)
1934 to 1938 ..	12 (12·4%)	33 (34·0%)	48 (49·4%)	4 (4·0%)

Summary.

Results are given of treatment by radiotherapy alone, at the Sydney Hospital between 1929 and 1943, of patients with cancer of the *cervix uteri* who have survived for fifteen year, ten year and five year periods, together with comments and a brief outline of technique and dosage employed.

Reference.

Mayneord, W. V., and Lamerton, L. F. (1941), "A Survey of Depth Dose Data", *The British Journal of Radiology*, Volume XIV, page 255.

SEASONAL VARIATIONS IN GROWTH OF THE COMPOSITE OR MAMMOTH PRE-SCHOOL CHILD.

By JOHN DALE.

From the Department of Health, City of Melbourne.

THE occurrence of seasonal variation in the growth of children has been recognized and investigated over a long period. The subject has been reviewed in recent years by Marshall (1937) and by Fitt (1941). There is general agreement that during the school years increase of weight is often greater during autumn and early winter than during the spring and early summer. Bransby (1945) states that the greatest seasonal weight increment occurred generally in the period from July to September and the least almost invariably in the period from April to June. Evidence regarding increase of height is conflicting, a majority of authors finding no definite seasonal variation, though some hold that increase of height is greater during spring and early summer than at other seasons of the year.

No considerable study of pre-school children is quoted by the authors mentioned. Reynolds and Sontag (1944) describe a study conducted on 133 children during the age-span from twelve to sixty months. They state that the period of maximum weight gain was from October to December and the minimum from April to June. The maximum height gain was from April to June and the minimum from October to December. Clements and Macpherson (1945), discussing the weight records of pre-school children in the Lady Gowrie Health Centres in Australia, state that the most striking irregularity is the

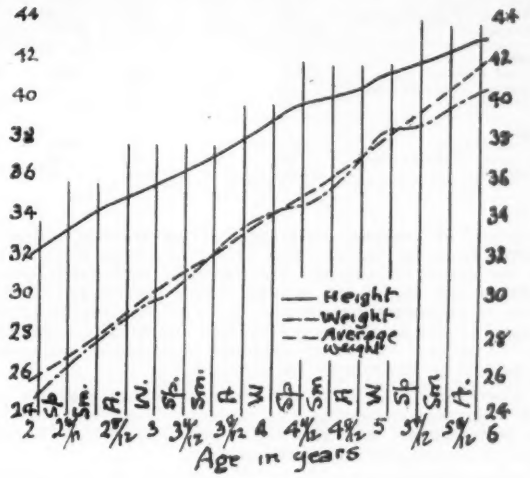

FIGURE I.

Graph showing seasonal variations of height and weight in girls.

reduction in weight increase during the summer months, and that children who show this characteristic put on weight rapidly during the winter months, and at a much reduced rate, or even not at all, during the summer. They

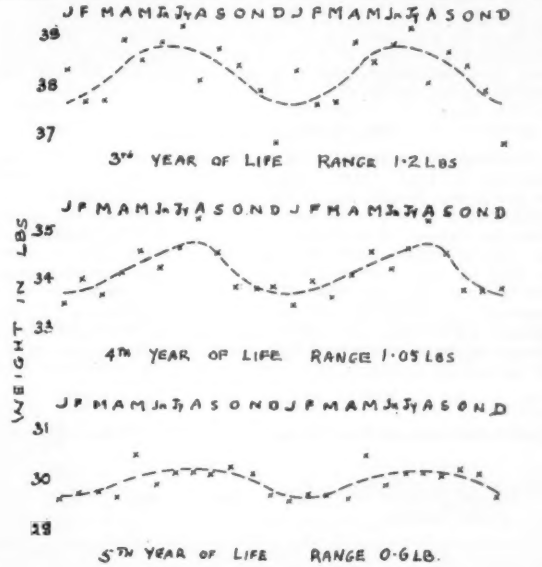

FIGURE II.

Weight curves, drawn through the averages of weights recorded by months during the third, fourth and fifth years of life.

add that the seasonal variation is most common in Perth and does not occur in Melbourne and Hobart.

When in 1937 an analysis was made of the heights and weights of pre-school children recorded in examinations in the health centres of the City of Melbourne (Kincaid and Stuckey, 1937), an effort was made to investigate the

TABLE I.
Average Weights (Recorded by Months) of Children During the Third, Fourth and Fifth Years.

Year of Life.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Third:												
Total weights	2958	2966	2969	2960	3052	2985	3013	3017	3010	3022	3014	2698
Number of observations	100	100	100	100	100	100	100	100	100	100	100	91
Average	29·58	29·66	29·69	29·60	30·52	29·85	30·13	30·17	30·10	30·22	30·14	29·65
Fourth:												
Total weights	2947	2312	3368	3245	3459	3422	3465	3525	3459	3247	3381	2370
Number of observations	88	68	100	95	100	100	100	100	100	96	100	70
Average	33·49	34·0	33·68	34·16	34·59	34·22	34·65	35·25	34·59	33·82	33·81	33·86
Fifth:												
Total weights	2376	2107	3767	3621	3852	3460	3921	2592	3875	3458	3794	1620
Number of observations	62	56	100	93	100	89	100	68	100	90	100	44
Average	38·32	37·63	37·67	38·94	38·52	38·88	39·21	38·11	38·75	38·42	37·94	36·82

question of seasonal variation by constructing growth curves from the record cards of children who were born in the month of August. Two hundred such cards were utilized and one of the growth curves constructed therefrom is reproduced in Figure I. The line representing weight is seen to rise in the autumn and to be almost flat in the spring. No clear evidence of seasonal variation is evident in the line representing height.

When after a lapse of ten years a further analysis of the weights and heights was made by McElwain (1947), no investigation was made, unfortunately, which would have demonstrated seasonal variation.

Soon afterwards, however, it occurred to the writer, during a brief period of insomnia, that if seasonal variation occurs it should be discoverable by regarding the children of the community as a composite or mammoth child and examining the recorded weights and heights of this composite child by months as it passed through the seasons.

It seemed that if the aggregate of a large number of weights recorded in each month of the year was divided by the number of weighings in each month and the averages so obtained were plotted, the lines so obtained would be likely to be a straight line if no seasonal variation occurred but would be curved if it did occur. Theoretically, it was easy to demonstrate that this assumption was correct, as will be shown later.

The Material Available.

Regular sessions for pre-school children—that is, for children in their third, fourth and fifth years—are held in the seven health centres in the City of Melbourne. A record card is kept for each child, and the records show that the number of individual pre-school children examined on one or more occasions has ranged from 726 in 1930 to 2182 in 1948, increasing steadily over the period except for a drop in 1937-1938 due to infantile paralysis and another in 1942-1943 owing to the disturbances of the second world war. At each of the centres, therefore, there are to be found some hundreds of current and recent cards of pre-school children, and cards current in 1946, 1947 and 1948 were used in the present investigation. The date of birth of the child is recorded on the card. Each child is weighed in underpants or pants and vest only and is measured for height without shoes, the observations being entered on the card with the date on which they are made. Weight is recorded to the nearest ounce and height to the nearest eighth of an inch.

The Investigation.

The first investigation was made as follows.

A chart was made up, divided into three sections, one for each of the third, fourth and fifth years of life. Each section was subdivided into 12 columns, one for each month of the year. A clerk then went through the current cards of a centre and called out the weights together with the month in which they were recorded and the year of life of the child. These were entered in the appropriate columns. The objective was to put 100 observations in each column. This proved to be difficult for certain months, especially in the fourth and fifth years, during which the children tend to cease attendance. The number of observations in each month, the aggregate weights and the average weight for each month are given in Table I.

The average weights so obtained were plotted on squared paper, and a curve has been drawn to indicate the trend of the variation, the curve in each case being continued for two years to give a better visual picture. These are reproduced in Figure II.

It will be seen that there is a small undulation in the third year of life, a larger undulation in the fourth year, and a still larger undulation in the fifth. The seasonal variations of the curves appear to correspond well and suggest that the months February to July—that is, autumn and winter—are a period of greater increase in weight.

The next step was to calculate model tables on the assumption that there was a seasonal variation, and that the period of rapid growth extended from February to July and that of slow growth from August to January. During their third year children increase in weight by approximately four pounds, and it was assumed that two-

TABLE II.
Model Tables Constructed on the Assumption that Pre-School Children Gain Four Pounds per Annum and that they Grow x Times as Fast During February–July as During August–January.

Rate of Increase in Growth (February–July : August–January).	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Eight times as fast:												
Total weights	436·3	436·3	439·4	442·4	445·4	448·9	451·6	451·6	448·9	445·4	442·4	439·4
Number of observations	12	12	12	12	12	12	12	12	12	12	12	12
Average	36·3	36·3	36·6	36·9	37·1	37·4	37·6	37·6	37·4	37·1	36·9	36·6
Five times as fast:												
Total weights	437·3	437·3	440·0	442·7	445·3	447·9	450·4	450·4	447·9	445·3	442·7	440·0
Number of observations	12	12	12	12	12	12	12	12	12	12	12	12
Average	36·4	36·4	36·6	36·8	37·1	37·3	37·5	37·5	37·3	37·1	36·8	36·6
Twice as fast:												
Total weights	356·7	356·7	358·0	359·3	360·6	362·0	363·3	363·3	362·0	360·6	359·3	358·0
Number of observations	12	12	12	12	12	12	12	12	12	12	12	12
Average	29·7	29·7	29·8	29·9	30·0	30·2	30·3	30·3	30·2	30·0	29·9	29·8

thirds of this increase took place in the period from February to July and one-third from August to January. A chart was constructed on this assumption, the months of the year forming the abscissæ and the four pounds, from 28 to 32 pounds, the ordinates. A line was drawn to indicate the growth of a child who became three years old on January 1. Beginning at 28 pounds, he grows at the slow rate for one month to the end of January. The line then changes direction and ascends to cover two and two-thirds pounds during the next six months. At the end of July the growth proceeds at the slow rate to bring him to a weight of 32 pounds at the end of December. Similar lines were drawn for each of eleven more children who enter their third year successively on the first of each month from February to December.

From this chart the weights of each of the twelve children during each month of the year were read off and entered in the columns of a table, the aggregates of which are shown in Table II. Each column contained 12 weights, and the aggregates divided by 12 give the averages for each month. These were plotted and are reproduced on Figure III.

It will be seen that the line so obtained corresponds roughly in the amplitude of its variation with the weight curve for the third year of life.

After various trials other similar charts were constructed on the assumption that growth in weight took place five times and eight times as fast in the period February-July as in August-January. The tables and graphs constructed from these charts are shown in Table II and Figure III. It will be seen that the lines of the graphs correspond reasonably well with the curves for the fourth and fifth years of life of Figure II.

It is not unreasonable to assume, therefore, that the data of Table I, illustrated in Figure II, indicate that seasonal variation in growth occurs, and that in their third year these children put on weight faster in autumn and winter than they did in spring and summer, and that in the fourth year the difference was greater, and in the fifth year greater still.

A further investigation was then made on a different basis. It was decided to prepare a chart for each of the years 1946, 1947 and 1948, each one being subdivided into 12 columns of months. Two such charts were prepared, one for weight and one for height. The cards were then gone over again, and the weights and heights of any child in the fourth or fifth year of life which were recorded in any of the three years, were called out and recorded in the appropriate column of the year. The objective was to put 100 entries under each month of each year, and this was nearly achieved. When completed the columns were added and divided by the number of observations to give an average for the month. These data are reproduced in Table III.

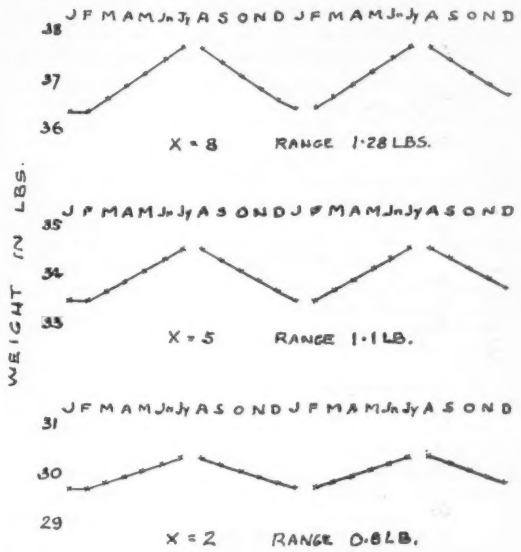

FIGURE III.

Model weight lines, constructed on the assumption that a child gains in weight x times as fast in February-July as he does in August-January, and that he gains four pounds in the year.

The total number of observations is 3406 for height and 3400 for weight, and the total number of cards reviewed in order to obtain the data was 1123; this indicates an

TABLE III.

Aggregate and Average Measurements of Children in their Fourth and Fifth Years of Life Recorded by Months in the Years 1946, 1947 and 1948.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
						Weights.						
1946:												
Total weights	2529	2739	3567	2071	3655	3321	3675	3676	3682	3759	3638	3682
Number of observations	71	77	100	58	100	89	100	100	100	100	100	100
Average	35·63	35·56	35·67	35·71	36·55	37·32	36·75	36·76	36·82	37·59	36·38	36·82
1947:												
Total weights	2257	3609	3557	3558	3579	3636	3677	2985	3735	3656	2921	3657
Number of observations	64	100	100	100	100	100	100	82	100	100	82	100
Average	35·27	36·09	35·57	35·58	35·79	36·36	36·77	36·40	37·35	36·56	35·68	36·57
1948:												
Total weights	3573	3627	3534	3726	3738	3715	3640	3559	3713	3638	3666	3713
Number of observations	100	100	100	100	100	100	100	97	100	100	100	100
Average	35·73	36·27	35·34	37·26	37·38	37·15	36·40	36·68	37·13	36·38	36·66	37·13
						Heights.						
1946:												
Total heights	2811	2974	3892	2242	3951	3498	3943	3967	3964	4010	3966	4007
Number of observations	71	76	100	58	100	88	100	100	100	100	100	100
Average	39·59	39·17	38·92	38·66	39·51	39·74	39·43	39·67	39·64	40·10	39·66	40·07
1947:												
Total heights	2440	3986	3929	3963	3941	3983	3946	2896	3996	3960	3237	3993
Number of observations	62	100	100	100	100	100	100	73	100	100	82	100
Average	39·35	39·86	39·29	39·63	39·41	39·83	39·46	39·67	39·96	39·60	39·48	39·93
1948:												
Total heights	3944	3981	3902	4013	3997	3985	3944	3828	3991	3970	4000	4031
Number of observations	100	100	100	100	100	100	100	96	100	100	100	100
Average	39·44	39·81	39·02	40·13	39·97	39·85	39·44	39·86	39·91	39·70	40·00	40·31

average of approximately three recordings of height and of weight per child during the fourth and fifth years of life.

The averages so obtained were then plotted and reproduced in Figures IV and V, and curves have been drawn

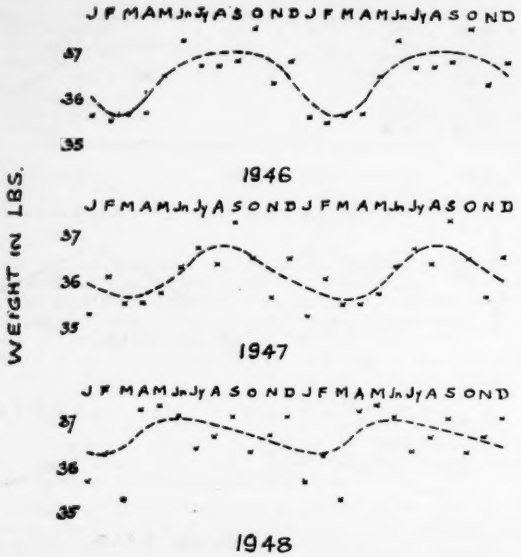

FIGURE IV.
Weight curves drawn through the averages of weights of children in their fourth and fifth years of life, recorded by months during the years 1946, 1947 and 1948.

to indicate the trend in each year. The weight curves appear to indicate again that the greatest increase occurs in the autumn and winter. The differences between the shapes and ranges of the curves of the different years suggest, as is obviously likely, that seasonal influences vary from year to year, and also suggest possibilities of investigating such variations.

The lines representing heights indicate that during 1947 and 1948 there was little, if any, seasonal variation. In 1946 there seems to have been a considerable variation.

It is regretted that the dispersion of the averages is so large. It is possible that the samples of children examined may have differed to some extent from month to month owing to such events as kindergarten holidays and the holding of sessions for immunization, and that the samples were to some extent biased. However, Dr. Hilda Kincaid, under whose direction the sessions are held and who attends many of them, informs me that in her opinion there is no substantial variation in the samples of children examined from month to month.

The range of variation in weight and height is considerable over the two years of life, varying as it did for weight from 22·5 pounds to 55 pounds and for height from 32 inches to 45 inches. Obviously, more satisfactory graphs would have resulted had more cards been available to give sufficient samples from a narrower age group.

The substitution of medians for means was carried out for a number of the less satisfactory graphs, but did not alter materially the shape of the curves. The medians for height for the first four months of the year 1946 correspond almost exactly with the means shown in Table III and Figure V.

Discussion.

The significance of seasonal variation obviously relates to whatever use may be made of norms in child welfare work. In commenting upon a graph illustrating the median weights of infants and pre-school children in the City of Melbourne in 1946, McElwain states that the growth curve is seen not to be a continuous simple function over the whole range, and that in the period two to five years it is almost rectilinear. However, both he and the present writer were aware that the straight line may be compounded of curves and that the circumstances may illustrate that there is no such person as the man in the street. Bransby thinks that seasonal variations in weight-growth

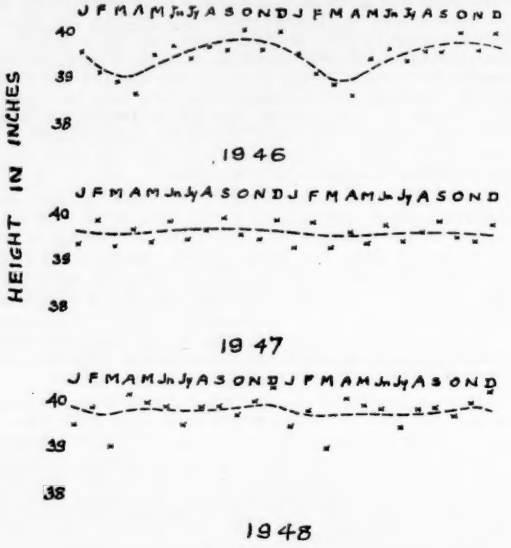

FIGURE V.
Height lines drawn through the averages of heights of children in their fourth and fifth years of life, recorded by months during the years 1946, 1947 and 1948.

have been accepted too readily as "natural and proper" phenomena, and that they are due, in part at least, to less than optimum growth rates or health status. He found that in two camp schools among 63 boys of good health status there was no evidence that growth in April-June was less than during the rest of the year, and suggests that the most difficult time for weight growth seems to be April-June, when children of poor health status do not appear to be able to withstand the unfavourable conditions. This corresponds to the suggestion of Fitt that spring-summer is the "period of major stress". Clements and Macpherson, on the other hand, state that a stationary weight chart during the summer months could not, in the absence of any other evidence, be considered unsatisfactory.

A main purpose of this communication is to publish what seems to be a new method of investigating seasonal influence on growth. Most, if not all, observers seem to have made their deductions from repeated observations on the same children over a considerable period, and such data are apparently not freely available. If this method is valid, as it seems to be, there must be ample data to which it can be readily applied.

The writer is very conscious that both the method and the data here presented call for skilled statistical treatment. Mr. S. Hammond, B.Sc. (Honours—University of Western Australia), of the Psychology School of the University of Melbourne, has been good enough to consider the material from the statistical point of view. He states that tests of significance show that the clearest result is that for the weight curve, 1946, in which the distribution of monthly points is significantly different from the horizontal line at the 5% level of confidence; that, however, a number of curves could probably be drawn which would fit the material well enough within limits of chance; and that the data for the other years, 1947-1948, are not so clear-cut, and do not yield results significantly different from chance expectation. After discussing the possibility of biased sampling, he goes on to state that the results can be taken as useful supporting evidence of the conclusions of other persons with respect to seasonal fluctuations.

Summary.

1. A new method of investigating seasonal variation in growth is presented.

2. The pre-school children in the City of Melbourne have been regarded as a composite child, and average weights of individual children weighed in each month of the year have been charted.

3. The curves so obtained suggest that seasonal variation in weight increase occurs, the increase being greater in autumn-winter than in spring-summer.

4. The variation seems to be slight in the third year of life, greater in the fourth year and greater still in the fifth year.

5. Graphs prepared from data obtained in different years suggest that there is variation from year to year in the shape of the curves so obtained.

6. Lines of average heights show no variation in the years 1947 and 1948 and evidence of variation in 1946.

Acknowledgements.

The writer is much indebted to Mr. K. C. Reis and Mr. R. Pritchard for help in collecting the data, and to Miss B. Gardiner for help in preparing the charts.

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THE TREATMENT OF CHRONIC FEMALE PELVIC SEPSIS BY SHORT-WAVE DIATHERMY: A REVIEW OF FIFTY CASES.

By T. W. BURGESS,
Sydney.

ANY treatment should aim to cure without deformity or loss of function if possible. This is particularly true in the case of the female pelvic reproductive organs, especially in the woman of child-bearing age. With treatment by short-wave diathermy we are employing the maximum degree of conservatism, inasmuch as we are assisting the normal body repairs. In the present list of 50 cases under review, although insufficient to allow the drawing of conclusive evidence, the results are perhaps encouraging enough to report on, especially as this treatment has not as yet received very much attention.

Method of Applying Treatment.

In every case in this series the abdomino-vaginal method was used with a surgical circuit of six millimetres' wavelength. With the patient lying in the recumbent position, a metal electrode of the Corbus and O'Conor type is inserted in the vagina so that it fits under and behind the uterine cervix. The dispersive electrode is then placed over the lower part of the abdomen anteriorly. A thermometer is placed in the vaginal electrode, and the high frequency current is then switched on. It is advisable always to use a low intensity for the first treatment, usually for twenty minutes or less, and with a maximum temperature on the thermometer of 100° F. The patient must be watched closely for any discomfort, such as increased pain or cramp-like sensations, and if these occur, the intensity of the current must be decreased. Two or three minutes before the end of the treatment, it should be gradually decreased to almost the minimum.

At the next treatment, if the patient has not had any exacerbation of pain or discomfort, the intensity and duration can be slightly increased until eventually a maximum temperature of 106° to 110° F. is reached and the duration of time of treatment is thirty minutes. Usually 106° F. is the maximum temperature in most cases. The treatment is usually given three times a week on alternate days, and the number of treatments varies with the type and severity of the condition being treated, the average case requiring 12 to 16 treatments.

An alternative method of application of the treatment has been tried, in which the electrodes are both applied externally, one under the sacrum and the other over the lower part of the abdomen. With this method the maximum vaginal temperature was found to be approximately 101·8° F. without discomfort from the sensation of heat due to the external electrodes in close proximity to the skin surface.

Since a greater temperature can be concentrated within the pelvis by the use of the vaginal electrode, it is considered a more efficient method of applying the treatment in the majority of cases.

Explanation of Variation in Temperature during the Individual Treatment.

There is a gradual decrease in the temperature after about ten to fifteen minutes. This is due to a dilatation of the pelvic blood vessels, causing a greater dissipation of heat from the part under treatment. The same intensity of the current was maintained throughout.

Types of Cases in which Treatment was Given.

It is difficult to classify under specific headings the types of cases in which treatment was given, as two or more of these conditions often exist together. With this in mind the cases are broadly classified under the following headings: chronic salpingitis and salpingo-ovaritis; blocked Fallopian tubes; chronic cervicitis and endocervicitis; chronic parametritis; post-operative adhesions.

Chronic Salpingitis: Salpingo-Ovaritis.

Cases in which chronic salpingitis and salpingo-ovaritis occurred form the majority of this series—a total of 28 cases—and apparently satisfactory results are obtained. The pain so frequently associated with this condition usually disappears completely, and any inflammatory mass felt *per vaginam* is in most cases cleared up or much reduced in size.

Blocked Fallopian Tubes.

In a total of nine cases of blocked Fallopian tubes specific treatment was given with the view of assisting the gynæcologist in obtaining patency. As shown in Table II, the treatment was successful in four cases.

Chronic Cervicitis and Endocervicitis.

Chronic cervicitis and endocervicitis are often associated with chronic salpingitis and are usually the cause of a varying degree of leucorrhœa. The leucorrhœa is usually increased in the early stages of the treatment. Those patients treated for cervical hostility were given short-wave and copper galvanic ionization. These have all been clinically cured, but the procedure was carried out for the treatment of sterility when there was defective sperm invasion of the cervical mucus (negative results in Huhner and Sim's tests). Though clinically cured of cervicitis, they were a disappointment to the sterility

TABLE I.

Case Number.	Complaint.	Probable Cause.	Duration of History.	Number of Treatments.	Results.	Comments.
1	Pelvic adhesions and pain right side.	Post-operative.	5 years.	12	Symptomless.	
2	Left salpingo - ovaritis. Double blocked tubes.	Miscarriage.	2 years.	8	Well, and mass disappeared.	Now has functional amenorrhœa.
3	Blocked Fallopian tubes.	—	—	16	Tubes not patent. Symptoms considerably relieved.	
4	Right salpingitis with mass. Sterility.	Miscarriage.	5 months.	17	Mass smaller. No pain.	Pregnant since treatment.
5	Bilateral hydrosalpinx. Tubo-ovarian mass left side.	Miscarriage.	2½ years.	12	Slight improvement only.	Subsequent salpingectomy.
6	Left salpingitis.	Three miscarriages.	2 years.	12	Symptomless.	Pregnant and confined one year after end of treatment.
7	Right salpingitis.	—	2 months.	10	Symptomless.	
8	Bilateral hydrosalpingitis. Blocked tubes.	No cause admitted.	"years."	5	No improvement.	Treatment given only for patency. Salpingostomy later. Probably treatment insufficient.
9	Left tubo-ovarian inflammation and mass.	Infection following lipiodol test.	1 year.	8	Symptomless.	Pain and leucorrhœa gone. Small residual thickening.
10	Blocked tubes.	—	—	8	Result of Ruben's test negative.	
11	Bilateral salpingitis.	Artificial insemination. Pelvic abscess.	6 months.	15	Tubes patent and pain relieved.	Not pregnant. Husband sterile.
12	Pelvic parametritis.	Laceration of vagina.	13 months.	13	Pain relieved. General symptoms less.	
13	Right tubo-ovaritis. Cervicitis.	Puerperal sepsis.	10 years.	20	Symptomless and mass gone.	
14	Left salpingo-ovaritis.	Ruptured appendix.	10 years.	12	Temporary relief only.	
15	Double tubo-ovaritis.	Miscarriage 3 months previously.	3 months.	9	Mass much smaller and painless.	
16	Double salpingitis. Cervicitis.	Laceration of cervix.	3 years.	16	Fornices clear. Symptomless.	
17	Left salpingitis. Adhesions. Sterility.	Miscarriage.	6 years.	12	Pain and mass disappeared.	
18	Bilateral salpingitis. Blocked tubes.	—	—	10	Symptomless. Tubes not patent.	
19	Double salpingitis.	—	—	10	Symptomless.	
20	Bilateral salpingitis.	Miscarriage.	6 years.	17	Almost symptomless.	General health much improved.
21	Bilateral salpingitis.	Miscarriage.	6½ years.	14	Pain and mass almost nil.	General health improved.
22	Right salpingitis.	None known.	4 years.	17	Symptomless.	
23	Pelvic parametritis of low grade infection.	Post-operative.	2½ years.	15	Symptomless.	General health much improved.
24	Left tubo-ovarian mass. Dense adhesions right side.	Induced miscarriage.	3 years.	19	Symptomless. Dysmenorrhœa cured.	Marked improvement in general health. Gave up treatment for blocked tubes.
25	Cervicitis.	Induced miscarriage.	2 years.	5	Result of Huhner test positive.	
27	Blocked tubes.	Induced miscarriage.	3 years.	10	Tubes not patent.	
28	Stenosed tubes.	Appendiceal peritonitis.	20 years.	6	Result of Huhner test positive.	Backache relieved.
29	Cervicitis.	—	6 years.	5	Result of Huhner test negative.	Very dry cervix.
30	Cervicitis and blocked tubes.	Spontaneous miscarriage.	"years."	5	Result of Huhner test positive.	Tubes patent.
31	Cervicitis.	—	—	5	Result of Huhner test negative.	Residual dry cervix.
32	Subacute bilateral salpingitis.	—	—	8	Slight relief of symptoms only.	
33	Cervicitis.	—	—	5	Result of Huhner test negative.	
34	Retroversion and fixed tender cystic ovary.	—	—	15	Symptomless.	Further operation avoided.
35	Blocked tube.	Ectopic pregnancy.	1 year.	12	Tubes patent (40 millimetres of mercury).	Pregnant. Miscarried.

TABLE I.—*Continued.*

Case Number.	Complaint.	Probable Cause.	Duration of History.	Number of Treatments.	Results.	Comments.
36	Cervicitis.	—	—	5	Result of Huhner test positive.	
37	Left salpingitis. Blocked residual tubes.	Ectopic pregnancy.	4 years.	12	Symptomless. Tube stenosed.	
38	Cervicitis.	—	12 years.	4	Result of Huhner test negative.	Residual dry cervix.
39	Stenosed tubes.	Miscarriage.	9 years.	9	Tubes patent and pain relieved.	
40	Bilateral salpingo-ovaritis.	Confinement.	2 months.	15	Slight improvement.	
41	Bilateral salpingitis.	—	10 years.	18	Free of symptoms.	
42	Blocked tubes.	Induced miscarriage.	17 years.	13	Tubes not patent.	
43	Left tubo-ovarian mass.	Stillbirth.	11 years.	11	Pain greatly relieved.	
44	Blocked tubes. Small tender mass right fornix.	Three miscarriages.	6 years.	9	Free of pain and leucorrhœa. Pregnant.	
45	Tubal stenosis.	Two miscarriages.	11 years.	9	Tubes still stenosed.	
46	Parametritis.	Appendicitis.	1½ years.	15	Free of pain.	General health much improved.
47	Right salpingitis. Retroversion.	—	"Years."	17	Well and very little pain.	
48	Right salpingo-ovaritis.	—	14 months.	17	Symptomless.	General health much improved.
49	Left ovaritis and adhesions.	—	4½ years.	14	Symptomless.	
50	Left pelvic parametritis.	Infected laceration of cervix following confinement.	6 months.	13	Symptomless.	

In cases 25, 28, 29, 30, 31, 33 and 36 the patients were given copper galvanic ionization in addition to short wave treatment.

doctor because the treatment resulted in a drying-up of the cervical mucus in half the cases, presumably from excessive destruction of the cervical glands. This was probably due to the copper ionization.

To summarize the matter, one may say that the treatment resulted in a clinical cure of the cervicitis, but was not applicable in cases of sterility, as it dried up the cervix and left an inadequate ocean of cervical mucus, in which the invading sperm could swim up to the tubes. The only way in which a sperm can progress is by swimming up the female genital canal in mucus.

Chronic Parametritis.

Four patients were treated primarily for chronic parametritis with encouraging results as shown in Table II.

TABLE II.

Diagnosis.	*Total Patients* Treated.	*Satisfactory* Results.
Chronic salpingitis and salpingo-ovaritis	28	24
Blocked Fallopian tubes	9	4
Chronic cervicitis and endocervicitis	7	3 (functional) 7 (clinical)
Chronic parametritis	4	4
Post-operative adhesions	2	1

Post-Operative Adhesions.

Two patients with post-operative adhesions were treated, and the result, as shown in Table II, was satisfactory in one case only.

Summary.

1. In this series the patients with gross chronic inflammation appeared to respond satisfactorily to short-wave diathermy. In thos ecases in which the pelvic symptoms are relieved, there was frequently a noticeable improvement in general health, even in the early part of the course, and this was often associated with a gain in body weight.

2. Treatment has been given for two separate purposes, namely, relief of pain due to pelvic sepsis, and cure of sterility due to pelvic sepsis.

3. In the group treated for pain there were 34 patients and 29 were cured or relieved to their own satisfaction.

4. In the group treated for sterility there were nine patients treated for blocked Fallopian tubes (combined with pressure treatment by carbon dioxide insufflation) and seven patients treated for cervicitis causing defective sperm invasion by galvanization and short-wave therapy.

5. Patients who are treated for the pain of chronic pelvic sepsis and not improved should be suspected of having endometriosis.

Acknowledgement.

I wish to express my appreciation to Dr. Alan Grant for his helpful criticism of this paper.

THE DEVELOPMENT OF STREPTOMYCIN SENSITIVITY IN PULMONARY TUBERCULOSIS: AN ANALYSIS OF CASES.

By JOAN A. MARSDEN and MARTHA RENTH,
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ALTHOUGH the use of para-aminosalicylic acid ("P.A.S.") in conjunction with streptomycin is now routine to reduce the incidence of resistant strains of the tubercle bacillus in the treatment of pulmonary tuberculosis, it was considered that an analysis of 41 cases of pulmonary tuberculosis in which the patient was given streptomycin might give useful information concerning the development of resistance.

In 29 of the 41 cases, sensitivity tests were carried out by the slide cup assay, as recommended by S. D. Rubbo and associates (1949). In the remaining 12 treatment was received before the test became available.

TABLE I.

Results of Sensitivity Tests Performed Before and After Treatment.

Name.	Dosage in Grammes.	Duration of Treatment in Days.	Results of Sensitivity Tests in Microgrammes per Millilitre Before Streptomycin Therapy.	Results of Sensitivity Tests in Microgrammes per Millilitre After Streptomycin Therapy.
M.C.	10	20	Some organisms resistant to 2; all sensitive to 10.	As before therapy.
M.W.	20	40	Resistant to 10; a few resistant to 20.	As before therapy.
B.F.	30 15 } 30 15 } (5 months later)	60 60	Sensitive to 1. All resistant to 2·5; some resistant to 5.	Sensitive to 2. All resistant to 10; some resistant to 100. All resistant to 100.
A.M.	10 30 (2 months later)	20 60	Most organisms sensitive to 2·5; all to 5. —	— All resistant to 20; some to 100.
L.O'H.	15 30 (4 months later)	30 60	Sensitive to 1. —	— All resistant to 10.
P.P...	20 15 (8 months later)	40 30	Sensitive to 0·5. All resistant to 10; some resistant to 100.	— All resistant to 1,000.
W.W.	30	60	All sensitive to 1.	All resistant to 10; some resistant to 100.
L.W.	30	60	Few resistant to 10; all sensitive to 100.	As before therapy.
A.R.	5	10	Some resistant to 10.	All resistant to 10.
T.N.	20 } 50 30 }	40 } 100 60 }	All sensitive to 2. —	Sensitive to 5; a few resistant to 100.

[1] All patients received as a routine 0·25 gramme twice daily intramuscularly.

In 10 cases, sensitivity was tested before and after treatment, in 12 cases it was tested only after completion of the course, and in six cases sputum or gastric contents were rendered sterile. In one case "P.A.S." was given after streptomycin therapy.

Analysis of the results in Table I shows that, of the 10 cases, the sensitivity remained the same before and after streptomycin therapy in three only, which represent dosage of 10, 20 and 30 grammes respectively. In the remaining seven cases, the sensitivity was reduced considerably.

TABLE II.

Results of Sensitivity Tests Performed only after Treatment.

Name.	Dosage in Grammes.	Duration of Treatment in Days.	Results of Sensitivity Tests in Microgrammes per Millilitre after Streptomycin Therapy.
M.W.	30	30	Some resistant to 10; all sensitive to 100.
K.T.	10	20	Some resistant to 10; all sensitive to 100.
	10	20	Sputum negative.
M.S.	20	40	All resistant to 10; some resistant to 100.
S.M.	10	20	All sensitive to 2.
M.S.	20	40	All resistant to 5.
R.T.	22	44	All sensitive to 10.
A.R.	30	60	All sensitive to 1.
F.D.	20	40	All resistant to 10; most sensitive to 100.
G.F.	15	30	All sensitive to 1.
E.D.	10	20	All resistant to 2.
L.C.	10	20	All resistant to 2; all sensitive to 10.
J.R.	15	30	Sensitive to 10.

Analysis of Table II, in which dosage ranged from 10 to 30 grammes, shows that in four cases out of the twelve final resistance was shown of 10 microgrammes per millilitre or more.

Out of a total of 22 cases in the two tables, in three of Table I and in eight of Table II the patient would be eligible for a further course of streptomycin. If we consider that a daily dosage of 0·5 gramme gives an effective blood level of 20 microgrammes per millilitre, the patient in those cases with a resistance of 10 microgrammes per millilitre or more would be unlikely to benefit by such a dosage, because allowance has to be made for loss by diffusion to tuberculous tissue. Further increase in dosage to effect a sufficient concentration in the lesions is limited because of toxicity.

The case detailed in Table III shows that the sensitivity of the tubercle bacillus population has decreased as a result of streptomycin therapy and that the subsequent increase follows the administration of "P.A.S.". It may be that this result is due to elimination of resistant strains of the tubercle bacillus population by "P.A.S.".

In the small number of cases presented, which is admittedly of no statistical significance, the impression gained was that the dosage is not the main factor in the acquisition of resistance of the tubercle bacilli.

TABLE III.

Name.	Dosage in Grammes.	Duration of Treatment in Days.	Results of Sensitivity Tests in Microgrammes per Millilitre after Streptomycin Therapy.
M.H.	15	30	All resistant to 1; some resistant to 2·5.
	30 (2 months later) (7 months later—after one kilogram of "P.A.S.")	60	Some resistant to 10; all resistant to 100. All resistant to 2; very few resistant to 10.

Apart from these considerations, the concept of "hormesis", as put forward by Emil Bogen (1949), has to be considered. Hormesis denotes stimulation of growth of tubercle bacilli by concentrations of streptomycin which are too low to be bacteriostatic.

Acknowledgement.

We wish to thank Miss D. M. Morris, of the Bacteriology School of the University of Melbourne, for performing the sensitivity tests.

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RECENT ADVANCES IN THE MANAGEMENT OF DEAFNESS IN CHILDREN.[1]

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THE problem of deafness has received increasing attention since World War I. The advent of the audiometer, which was being demonstrated in London and Berlin in 1929, stimulated still more the world's interest in the study of deafness; *pari passu* there came improvements in other electrical apparatus, including "hearing aids".

Treatment, reeducation and rehabilitation of the deaf of World War II advanced still more in the last decade. It was possible to attack the problem more intensely, not only because of greatly increased government and private moneys, but also because organized teams of scientific workers were enabled to concentrate on particular phases of the subject. As a result, there is now evidence of standardized advances in many countries, as seen in otology departments, audiology clinics, hearing and speech centres, institutes for the deaf, and government and private schools. In several universities there exists a specialized syllabus, including studies suitable for teachers of the deaf. A mobile speech and hearing camp incorporates standardized equipment and procedures for children on vacation.

Australia has already seized on many salient features of such advances. In so far as this paper is concerned, it is proposed to deal only with the problem of young children who may be totally, severely or partially deaf, and the applicability of recent advances to such children.

It is axiomatic that if a child cannot hear the speech of others it will not learn to speak itself. According to the ætiological factors involved, a child may be totally, severely or partially deaf, and each child, according to the measurable degree of hearing loss, may be classified for a different type of home training and education.

Developments in electrophonics have rescued many of these children from the "world of the deaf".

It is estimated that congenital deafness accounts for just over 50% of cases of deaf-mutism. In such cases the vestibular apparatus is usually normal or may be a little hypoirritable. In acquired forms, however, the vestibular apparatus, as well as the cochlea, is usually involved, and hence vestibular reactions are usually absent.

Ætiological Factors.

In these observations there is no intention of commenting on the long list of congenital and acquired types of deafness in children, but it is desired to comment on post-rubella deafness (so-called) and psychogenic deafness.

Post-Rubella Deafness.

From the 1940-1941 rubella series it would appear that deafness is most likely to occur if the mother suffers an attack of rubella at about six weeks or the third month of pregnancy.

> These times correspond to major developments of the ear discussed by Mann, the main development of the cochlea beginning at about six weeks, while the period at about three months corresponds closely with rapid developments of the organ of Corti (Murray, 1948).

Carruthers (1945) discusses the importance of the stage of pregnancy at which infection occurs and implies that the virus or toxin inflicts damage on the developing embryo of Scheib's type of sacculo-cochlear degeneration, in which "the cochlea, especially Corti's organ, and the saccule show evidence of maldevelopment; that is, the specialized epithelial structures which have to do with hearing are poorly differentiated".

Louise Hopkins suggests further experimental studies on the placenta-passing viruses in mammals and their effect on developmental anomalies.

Post-rubella hearing loss is usually very severe, but deafness is not total.

Murray (1948) has shown that the average hearing loss, both ears being considered, is 72·1 decibels for those impaired at the six-weeks term and 72·4 decibels for those about the three-months term.

> The general pattern of deafness is one in which the loss to low tones is greater than the loss to high tones with a fairly even change throughout the speech range.

A wide difference may be found in the hearing loss of the right and left ears.

Gregg (1941) noted that in congenital cataracts following German measles in the mother "the defect was monocular in 16 of the 78 cases reviewed".

This unilateral impairment would seem analogous to the wide difference in hearing loss of the two ears, and gives rise to the question whether some distortion of sound perception may account for a degree of superadded psychogenic deafness as well.

A hearing aid is usually fitted to the better ear, and in some cases there is sufficient residual hearing to justify such fitting. Hence the patients may be trained by acoustic and oral rather than by other methods. In the Darlington Institution for Deaf Children, Sydney, there are now about 35 post-rubella pupils fitted with individual hearing aids. Four group-aids are also in use. Among these pupils there is no outward evidence of impairment of the vestibular apparatus, although cochlear damage is severe.

Psychogenic Deafness.

So much interest seems to have been aroused in the subject of psychogenic deafness overseas that mention of salient features would seem desirable. In a paper from the Department of Education of the Deaf, University of Manchester, I. R. Ewing and A. W. G. Ewing (1944) mention that "of a total of 72 children between the ages of three years and four years eleven months referred to the clinic, because they were dumb or because their speech development as a whole was either partially or severely retarded, 29% proved to have normal capacity to hear".

Westlake found that "children of three and four years of age show less consistency in their responses to the pure-tone tests and show a wider deviation from the accepted normal threshold than older ones do, but these are very probably due to other factors than auditory acuity".

The statements aforementioned stimulate interest in the possibility of a psychic factor in deafness.

Froeschels (1944), in a long and wide experience of patients with speech and voice disturbances, has seen only 12 psychically deaf children, and asks: "Is the condition in question really so rare or is the differential diagnosis so difficult that many children may have been mistakenly considered deaf?" He believed the audiometric test was not applicable to children under five years of age. In his own experience many children who were deaf according to audiometric tests heard many sounds when tested by a method of "direct tone production", involving use of the accordion of Urbantschitsch.

The accordion has 42 whistles, forming a scale of six octaves ranging from G1 to F4. In the "direct tone method" a rubber tube is inserted into the patient's meatus, and the other end touches the whistle. Hence the tone enters the ear directly, and if it is heard a reflex results, such as blinking, withdrawing the head and even jerking movements of the eyeballs.

These reflex movements do not depend on collaboration and strict attention of the child as the audiometric test does, hence the alleged advantages of the method.

Froeschels then quotes three cases of psychic deafness in children. In a child aged four years, three weeks of

[1] Read at a meeting of the Section of Pædatrics of the New South Wales Branch of the British Medical Association on March 23, 1950.

frequent attempts to obtain any response to acoustic stimuli failed; he then reacted to a small bell three metres behind him and frequently reacted to the same bells during the following days. A second child, aged six years, according to her parents did not react to any kind of acoustic stimuli at home. By the "direct tone test" she was found to hear every tone of the six octaves at over 10 metres. She relapsed into permanent hardness of hearing a year later. It was assumed that a psychic component existed in the initial deafness, and later there occurred a disease of Heschl's centre and the central acoustic pathways. In a third child, aged two years and five months, Froeschels concluded that the initial deafness was psychic, and from the data over a long period he assumed the presence of a gradually decreasing defect in the acoustic centre.

> Not before this trouble had been reduced to one of moderate degree could any regular charging of Wernicke's centre be expected. Such charging must reach a certain strength before understanding of speech, spontaneous repeating of words and spontaneous speech occur.

The foregoing illustrates not only the difficulty of differential diagnosis, but also the precaution necessary in diagnosing real deafness in children.

At the Johns Hopkins University and Hospital, with the use of galvanic skin-resistance response, audiometric work is proceeding "to determine the hearing threshold of infants and young children and in making a differential diagnosis of a psychogenic overlay on organic hearing impairment and of malingering" (Bordley *et alii*, 1948). An instrument records the activity of the sympathetic nervous system in response to acoustic stimuli. It gives a highly sensitive wave record of galvanic skin-resistance response.

By use of the pure-tones of an audiometer, with faradic shock as a conditioning agent, the responses of the sympathetic nervous system to the audiometric tones are amplified and charted with a recording milliammeter. From the recorded wave-response a standard audiogram of pure-tone threshold is plotted.

I am informed that when an infant is conditioned for sound, followed by shock, such as current applied to an arm, then the sweating sympathetic skin resistance may be seen in the palm of the hand. Thus in psychogenic deafness, or in the case of infants too young to talk, the threshold of hearing can be detected by the sweating induced.

Results were obtained in children as young as eleven months and in 200 children under the age of three years.

The Doerfler-Stewart test for psychogenic deafness, with its noise at increasing intensities superimposed as a background, while useful in adults is not suitable for young children.

Froeschels (1944) states:

> It is probable that the basic trouble in psychic deafness in children consists of a slight defect of Heschl's convolution. This defect can most easily create an aversion of auditory impressions. Both these components may form a vicious circle, so that gradually the clinical picture is aggravated.

When we think in terms of psychogenic overlay, the question arises whether post-rubella deafness may be regarded as partly psychogenic and not completely organic, as involving a distorted auditory perception, which a child may prefer to disregard and not to hear.

Is there not such a parallel in suspenopsia, a condition in which an individual prefers to suspend mentally his distorted visual perception?

Out of such factors as mentioned comes the problem child of the clinics for the deaf. Hence the great time and stress laid on intelligence, social competence, special aptitudes, motor ability and personality.

Myklebust states:

> Audiology has been defined as the science of hearing. It seems necessary that it be influenced more by the fields of special education, psychiatry and clinical psychology.

Among deaf children there is obviously great scope for the psychologists' ministrations and research. In most clinics and schools they are in evidence. There is a noticeable reaction, however, in the fear that they may assume a role largely beyond their capacity.

The fact remains that on the psychologist, who may also be a graduate teacher of the deaf, there rests the responsibility of changing an introverted deaf child into one with a sense of social adequacy, of dealing with his many complexes, of deciding his attitude and intelligence, and developing his personality in the formative pre-school years.

The Importance of Early Diagnosis of Deafness.

The importance of early diagnosis of deafness is stressed for various reasons: (i) that an educational programme may receive consideration; (ii) that guidance may be given to the family contacts; (iii) that abnormal behaviour may be understood and counteracted; (iv) that the diagnosis may be known if legal adoption is considered; (v) that medical treatment may be commenced if necessary; (vi) that a hearing aid may be fitted if indicated.

As already mentioned early diagnosis may be very difficult, hence the many methods in vogue. The reliability of some of these methods in young children is still controversial.

Writing in September, 1944, I. R. Ewing and A. W. G. Ewing, in speaking of a group of children from war nurseries aged three years to four years and eleven months, commented:

> Pure tone audiometric tests are unsuitable for these children because: (*a*) They cannot maintain interest in listening to pure tones for long. (*b*) Reliable threshold readings cannot be obtained before the child's interest and attention flag.

Of another group of the same age referred because they were dumb, or because speech development was either partially or severely retarded, they found that "some of the older children, among those who proved to be either not deaf at all or partially deaf, learned quickly to respond to loud or fairly loud pure-tone stimuli, but that they were not interested in listening to such meaningless sounds. The audiometer in itself roused little or no interest, and the child's attention was apt to wander. Our experiments showed that except in three or four cases of very intelligent partially deaf children, it was not possible to obtain threshold readings."

Froeschels (1944) considered that the audiometric test was not applicable to children under five years of age.

In 1944 the Ewings published their methods of testing the hearing of young children involving the following tests: (*a*) voice and speech tests; (*b*) percussion toys, including bell, drum, triangle *et cetera*; (*c*) a range of pitch pipes from 120 cycles to 1900 cycles; (*d*) "meaningful sounds", such as the clink of a feeding bottle, a knock at the door, light tapping *et cetera*.

Among the many conclusions drawn were the following.

In the first six months, every hearing child tested showed by his responses to all or to some of the tests that he could hear.

In the second half of the first year, every hearing child reacted to at least one of the pitch pipes. If a child does not respond to the sound of voice by the end the first year, either he is deaf or he has some other form of gross defect. The existence of residual capacity to hear loud sounds can be proved by a deaf child's reflex and learned response to a range of very loud stimuli.

In the second year, nearly all responded to one or more of the pitch pipes, but though useful they are not as yet an accurate means of measuring the range of frequency over which a child of this age-group can hear. Simple speech tests are suitable for most of the children over the age of one and a half years, and for a few intelligent younger ones. All children, except the totally deaf, responded to the sound of a *fortissimo* voice at one foot. The tests yielded reliable, but only approximate, information about the range of frequency and intensity over which a partially or severely deaf child could hear.

Between two years and two years and eleven months speech and voice tests proved to be a satisfactory means of testing hearing. Pitch pipes now proved to be a suitable means of testing a child's responses to a range of frequencies.

Between three years and four years and eleven months the procedure included training through which the child learnt to respond in a specific way to a visible symbol and later, if he could, to sound. Manipulative toys were used in response to a visible signal—for example, the beat of a drum. Other signals used were the bell, pitch pipes, speech, voice and the "Go" test. Audiometric tests were found unsuitable. Among the conclusions drawn in this age group were that quiet speech wins a quicker and more interested response than loud speech, and that the whispered voice is now a suitable means of testing hearing. The tests proved to be a reliable means of detecting deafness in children who were dumb *et cetera*. From the results of the tests it was possible to form an opinion about the kind of special educational treatment each child needed.

Following the Ewings' work came the reports of N. E. Murray (1948), in which he recorded that the hearing of a large number of children had been measured by pure-tone audiometers. As a result of these investigations it was claimed that "in almost all cases where the children were four years or older, an accurate audiogram could be obtained", and later the main effort in this measurement of hearing loss was being directed to younger children *et cetera*.

A further series of tests was made on 92 children at the age of four years, and nine months later, at the age of four years and nine months. "The result of these tests shows the average hearing loss on test and retest is almost all within ± five decibels, and evenly distributed about the original measurement."

On this basis, according to Murray, the hearing loss may be measured at the pre-school age of four years, and a child may be educated "according to the hearing obtained, when fitted with a wearable aid, individually prescribed, adjusted and fitted from the child's audiogram".

Murray, in the same paper, reports that "aids are now fitted to children at three to four years old".

In view of the great advance in education foreshadowed as a result of such work, further discussion is awaited with interest from those who have not concurred in the accuracy of audiometric thresholds in children of this age, and from those who considered that threshold testing was unsuitable below six years of age.

It is well recognized, however, that whatever the severely deaf child manages to hear may improve his speech—hence full use is made of the child's sense of sight, touch and whatever residual hearing is present. They feel through vibration and hear through their inadequate auditory sense. To quote Lexington School, New York:

> The use of residual hearing . . . is not designed to make hard of hearing children out of our deaf children, but rather, through this medium to improve their speech to the greatest degree possible.

Another controversial question now arises. What is the highest decibel loss at which an artificial aid may be of use in a child's education?

Much has been written on this question, and there is a constant urge to improve on the 65-decibel level recommended for grading classes in the English schools. Former adherents to the 70-decibel level may now concede that on the 75-decibel line intelligent children may be assisted.

C. V. Hodgins, of Harvard, recently "tested the response of spoken words of 26 children with an average loss of 78 decibels. The score for lip reading alone was 43%, for a hearing aid alone 23%, but when lip reading and hearing aid were combined, 65%. This was in very deaf children whose school training was in lip reading."

Hodgins's observations seem to indicate that children with 78 decibels loss benefit greatly if trained with a hearing aid. However, much would depend on the intelligence standard of such children.

All the factors involved being recognized, the tendency in some smaller schools is to watch progress with an "aid" if any residual hearing is present and not to adhere strictly to a decibel limit of hearing loss. The child's progress will show whether retention of an "aid" is justified.

This trial and error method recognizes the possibility that, in very deaf children, even a background of whatever the child can perceive through an aid may help his progress. Thus, he may become eligible for oral training rather than manual (finger) training.

To a traveller through the United States of America and Britain it becomes obvious that educational training of deaf children, and at a later age rehabilitation of the deaf, follows a fairly well defined pattern. The thoroughness with which it is implemented depends on the money available to finance the installation of expensive soundproofing of buildings, electrophonic equipment and payment of skilled staff, each one of whom is a specialist, comprising a team.

In the team are otologists, graduate teachers of lip reading and speech training, psychologists, electronics engineers, acoustic technicians and audiometricians. From the otological examination and with the assistance of an audiogram, it may be decided whether an artificial aid is likely to assist the child. A psychologist's report will also be considered on such points as behaviour, mental dulness, congenital aphasia and psychogenic factors. Consideration may be given to the case at a round-table conference by otologist, psychologist and teacher. Training may begin at the age of two and a half years or less (Saint Louis, United States of America), or at the age of three years or less (Lexington School, New York).

Acoustic training is aimed at through individual or group aids, with preference for an individual aid.

Oral training may be decided on if there is not sufficient residual hearing for acoustic training. Very few are now relegated to "silent classes", where manual or finger language is taught, for in time the child tends to become isolated to the community which understands only such means of communication.

In almost all schools sign language is excluded. Exaggerated gestures, facial expressions or exaggerated lip movements are discouraged.

In Paris "*la mimique et la dactylologie en sont rigoureusement exclues*".

Comment on Typical Class Room and Equipment in United States of America.

In one New York school for the deaf, training nearly 300 pupils, class rooms are sound-treated. Television is installed. Educational "movies" are in use.

Group Hearing Aids.

Each class room is equipped with a group hearing aid, there being one outlet to each of the 12 pupils. Each unit is binaural. Each child has individual ear moulds. A volume control is provided for each child. A microphone is at the teacher's desk with a decibel output indicator, so that the volume output is known to the teacher.

In another room is an overhead general microphone, and in this case a microphone at each desk is dispensed with.

Electrophonic engineers were at the time developing another type of class room multiple hearing aid that would be efficient, compact, relatively inexpensive and easy to instal and repair.

Individual Hearing Aids.

More than 60 pupils had personal hearing aids, and a programme of individual tutoring in the use of these personal aids also existed.

Elsewhere, even more elaborate sound-proofing was noticed, the carpeting being over iron subway gratings, these over a cement floor, which in turn stood on railroad springs. The walls were of fibre-glass overlaid with muslin. Acoustic tiles lined the ceiling.

At a later stage some classes were conducted with windows open on to a noisy street, in the realization that the pupils' future may be spent in noisy surroundings.

Hearing-testing and audiometry rooms should be adequately sound-proofed if the data gained therein are to be reliable. Such a room may be air-conditioned.

Teacher Training.

Several institutions have an affiliation with a university teachers' college. Thus teachers may proceed to a "degree" while attending the institution as a training school. They may graduate in courses embracing speech training, physics, psychology, audiometry, and such allied subjects as will equip them for training and teaching the deaf.

These graduates of famous universities are found far and wide throughout the United States of America, not only as teachers of the deaf but also in institutions where the problems of the deaf and speech-impaired folk have to be handled.

In the aforementioned school, 19 of the list of 25 teachers have graduated in such a course. Are such teachers trained in Australia?

The salient features, then, of American schools for the deaf may be summarized as follows: (i) academic qualifications of teaching staffs; (ii) university affiliation; (iii) the importance in the educational programme of a good library, with whole-time librarian, television, educational "movies"; (iv) successes of vocational department; (v) small classes, with friendly relationship between teachers and pupils, promoting suitable environment for personality development—the psychological approach; (vi) adequate hearing aid and electrophonic equipment; (vii) sound treatment of rooms; (viii) research departments; (ix) mobile speech and hearing camp.

Auditory training is the preliminary training in the wearing of a selected hearing aid. Such training is regarded as essential for adults, whose usual course is six visits of two hours each, in which the patient not only learns the art of listening through his "aid", but learns to appreciate and overcome the difficulties of himself and others in its use. Talks are given on physiology, anatomy *et cetera*, and music records are interpolated. Preliminary or auditory training is a course for adjustment of the patient to his hearing aid.

Scott Stevenson revealed that in one hearing-aid clinic in 1946 50%, and in 1947 33·3%, of the hearing aids prescribed were being returned within a week or two. K. M. Day, in America, calculated that 75% of all aids purchased were eventually discarded.

On the other hand, Eva Thompson, in the United States of America, wrote that of 2216 navy patients fitted with aids who had gone through a four to eight weeks' rehabilitation programme, 94% continued to wear their aids with satisfaction at the end of twelve months. The importance of auditory training is therefore obvious.

To what extent is an equivalent preliminary auditory training applicable to very young children, and is its importance realized?

Evaluation of a Hearing-Aid.

In one clinic, 27 types of hearing aid were available (all conforming to American Medical Association standards). All these aids give good results with appropriate types of deafness, but, it was stated, aids of the same make may vary very slightly.

A standardized method for choosing a hearing aid was therefore devised. The patient in an adjoining sound-proofed room is watched through a window by the tester, who reads the Spondee and phonetically balanced word lists over the microphone at a 42 decibel level (that is, the average voice level in a quiet room), and the patient repeats them. By the score gained, the most suitable hearing aid may be chosen.

It is obvious that young severely deaf children have neither the understanding nor the concentration to respond satisfactorily to the aforementioned auditory training and hearing aid evaluation routine. In this era of smaller and better hearing aids for younger and deafer children, the question arises: "How may these essentials be applied when hearing aids are being fitted to such children?"

As mentioned earlier in this paper, it is claimed that "a hearing aid may be adapted to the child's audiogram" (Murray, 1948). Such audiograms pertain to an earlier age and a lower decibel level than is usually accepted.

As aforementioned, an adult patient can evaluate his aid by a standardized method, but with young and very deaf children evaluation of efficiency by such standards is not possible.

The Present Position in England.

In England the problem of deafness in children is being handled vigorously. Extracts from the work of Professor A. W. G. Ewing and Mrs. Irene Ewing, of Manchester University, have been quoted in this paper. Clinics also exist in conjunction with certain ear, nose and throat hospitals.

The magnitude of the work is evident from figures given by the National Institute for the Deaf in their publication "In the Service of the Deaf": "There are some 32,000 born-deaf persons in the British Isles of all ages" and "of the hard of hearing persons—it is estimated that some 150,000 are sufficiently deaf to need assistance in lip-reading instruction, the prescription and supply of hearing aids, industrial rehabilitation and the provision of suitable social amenities".

The 60 special schools for the deaf are all recognized by the Ministry of Education.

> The schools are staffed by qualified teachers, who, in addition to their ordinary teaching qualification, hold a special qualification to teach the deaf granted by the National College of Teachers of the Deaf, or the Department of Education of the Deaf at Manchester University.

The *Education Act*, 1944, makes compulsory the education of all deaf children in special schools from the age of five to sixteen years, and local authorities are obliged to admit them "to special schools at two years if the parents desire it", for "at the age of two years and under it is possible to begin to develop the capacity to comprehend speech through lip reading or better still, where partial hearing exists, through hearing combined with lip reading" (Ewing and Ewing, 1944).

Opportunity was taken to study the routine followed by a severely deaf girl, aged five years, at her pre-school examination, followed by her placement in a suitable school for the deaf. In such a case there is now a point at which the advantages of the *National Health Act* and the *Education Act* pass imperceptibly from one into the other to facilitate the child's education.

The child was first referred to the Royal National Throat, Nose and Ear Hospital, London, which, under the National Health Scheme, is now staffed and equipped for otological diagnosis, audiometry, psychological examination *et cetera*. Under the National Health Scheme a "Medresco" hearing aid was provided and an individual meatal insert made. Practical training in the making of inserts is given in the hospital.

A school with classes for the deaf, and nearest to her home, was then chosen for her future education.

In a public school unit for the partially deaf, the classes were much larger than seen elsewhere, with possible loss of personal friendly relationship between pupils and teachers. Under the National Health Scheme "Medresco" hearing aids had been provided, and "acoustic training" methods were in vogue. Groups commenced at the age of five years or earlier.

In one class with pupils aged nine to twelve years, notes on the degree of hearing loss and on the audiogram were available.

In another class both "individual" and "group" aids were in use. This class responded well to their teacher speaking into a microphone and facing the class. Pupils

did not respond, when they used their individual aids only, if the teacher's lips were not visible, and obviously they did not hear. The teacher enunciated clearly and spoke loudly throughout. My impression was that the class heard no question with combined individual and group aids but lip-read the teacher well.

In another class the deaf were mixed and taught with a class of normally hearing pupils. Here the tendency was for the teacher to raise his voice for the benefit of the deaf and to the detriment of the normal child. I formed a poor impression of this system, which may give a psychological uplift to a hard-of-hearing child, but is a definite strain on the normal human being. I have since heard that this system is on trial only.

Such observations were made over too short a time for conclusions to be drawn on the final results likely to be achieved in school, and I am unaware of the cost to the country.

Fundamentally the methods in vogue, of diagnosis, allotment of individual and group hearing aids, and the psychological approach are similar to those aforementioned.

Differences noted were as follows: (i) an eminent medical graduate was director of the otological-audiometric-hearing aid group of activities; (ii) voice-level indicators were absent in class rooms; (iii) sound treatment of class rooms was seldom seen; (iv) mixed classes were composed of normal and hard-of-hearing pupils (believed to be on trial only); (v) larger classes may not permit concentration on exceptional pupils.

Elsewhere are to be seen children fitted with hearing aids which they appear to disregard and through which they did not respond. They relied solely on lip reading, vibration *et cetera*, and with good result. A round-table conference might in such cases elucidate the following points: (*a*) Is the child's decibel hearing loss too great to be assisted by a hearing aid? (*b*) What is the psychologist's report on intelligence and other factors? (*c*) Is the system of servicing hearing aids in the institution adequate? (*d*) Is the equivalent of an auditory training course available?

The impression formed in England was that a splendid effort had been made to deal with the huge "problem of deafness" in young people. To my critical remarks I would add words of admiration for the results achieved by the Mary Hare Grammar School (Sussex):

> This school was set up for 48 pupils ranging from 12 to 18 years of age. Only a few pupils have a remnant of hearing. The 48 pupils are completing a finishing course in preparation of High School examination certificates, 1949. The curriculum includes English, Literature, French, History, Geography and religious knowledge.
>
> The pupils have been taught lip-reading and speech practice. This was the first time in Britain that a group of deaf children had sat for such an examination.

That such a high educational standard has been attained by such very deaf children speaks volumes for the methods adopted in England.

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WEBER-CHRISTIAN SYNDROME.

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RELAPSING FEBRILE NON-SUPPURATIVE PANNICULITIS (Weber-Christian disease) is characterized by recurring bouts of fever, associated with crops of nodules, varying in size, usually on the arms and thighs, also on the chest, abdomen and back and less frequently on the lower limbs. The nodules may be tender or painless. In the early stages they are erythematous and raised above the level of the skin. In the following weeks or months they regress, leaving shallow or pitted areas covered by normal skin.

From a review of the available literature, it would appear that thirty or so typical and atypical cases have been recorded. V. de P. Larkin, A. G. de Sanctis and A. E. Margulis (1944) reviewed the subject and reported a case. Harry L. Arnold (1945) reported a case with treatment. Henry Ungar (1946) also reported a case with autopsy findings, followed by a further report of a case with treatment by Maurice L. Zee (1946).

Ætiology.

The ætiology is unknown. Focal infection, iodides and bromides have been mentioned by various authors. Ungar (1946) mentioned "lipogranulomas", described by Russian pathologists (Abrikossoff, 1926, 1939). The nodules were observed in obese patients during the period of convalescence from infectious diseases, especially relapsing and typhus fevers. The lesions made their appearance predominately in the *panniculus adiposus* and in the retroperitoneal adipose tissue, the great omentum and the mesentery. These were similar in many respects to the Weber-Christian syndrome.

Age.

The age of patients affected ranges from one year and eleven months to sixty-nine years.

Sex.

Larkin *et alii* reviewed a series of cases of which 22 were in female patients and six in male patients. Arnold's case was in a female patient, as was Ungar's. Zee's case was in a male patient. The present case is in a female patient. It might be suggested that the more pronounced *panniculus adiposus* in the female is a contributory factor to account for the higher incidence in the female.

Duration.

The course of this disease has varied in length from one month to fifteen years.

Histology.

Ungar points out that the remarkable and unpredictable cropping-up of inflammatory foci in widely separated areas of the body suggests the effect of a blood-borne noxious factor and that the histological findings appear in the literature under a variety of names. No bacteria are found in the adipose tissue lesion, and the granulomatoid lesions are of a non-specific character. There appears to be no explanation for the temperature variations or for the apparent effect of chemotherapy. I feel that there may be some relationship between the skin lesions and the collagen diseases.

Report of a Case.

Mrs. A., aged sixty-eight years, first consulted me two years ago with a general feeling of fatigue, some tightness of muscles, loss of appetite, feeling of heat and cold at times, loss of weight and occasional attacks of diarrhœa and

abdominal pain. Her past history contained nothing relevant. She had had no operations. She had five children all alive and well. She had been treated for anæmia some years previously. Her early girlhood was spent in Suva. From time to time, small cutaneous nodules had appeared on the forearms, thighs and back, some tender to the touch, others not tender. She was usually made aware of a new lesion some day or so before its appearance by a peculiar feeling of "tension" in the selected areas. Some of these lesions remained for up to two months. The patient was a thin, mentally active woman; the result of a complete physical examination was essentially negative except for the nodules and a smooth, red tongue. A blood count revealed a hæmoglobin value of 14 grammes *per centum* (81% Sahli, 101% Haldane), a total erythrocyte count of 5,390,000 per cubic millimetre and a colour index of 0·84. The leucocytes numbered 8000 per cubic millimetre, being made up of neutrophile cells 80%, eosinophile cells 1%, lymphocytes 16% and monocytes 3%. The cells and platelets were normal in appearance except for a slight shift to the right in the neutrophile cells. The results of Wassermann and Kahn tests were negative. X-ray examination of chest, spine, renal tracts and alimentary canal (after a barium meal and barium enema) showed no abnormality. The result of urine examination was essentially normal. The blood pressure was 140 millimetres of mercury (systolic) and 90 millimetres (diastolic). The patient was not able to sustain a fractional test meal, and owing to domestic problems and the age of the patient, it has been impossible so far to have a biopsy performed on a typical lesion. The lesions usually varied from one to six millimetres in diameter, were moderately firm to touch, and at the onset were usually deeper in colour than the surrounding skin.

Treatment.

A number of forms of treatment were tried, including acid therapy by mouth, but it was not tolerated, and finally penicillin for oral administration (Sigma), 50,000 units per tablet, was given at the rate of four tablets per day for a period of ten days. This was followed by the administration of 500 milligrammes of aureomycin (Lederle) every six hours by mouth for a period of forty-eight hours. Three months later, no further nodules have appeared, and a considerable improvement has occurred in the general health of the patient. Whether this is due to therapy or to a natural remission remains to be seen.

Differential Diagnosis.

Certain agents and diseases produce similar pathological results, but not the same clinical features, as in subcutaneous fat atrophy (Rony, 1940) and atrophy of subcutaneous tissue in diabetic patients after insulin injections (Rowe and Garrison, 1932) and in addicts who use hypodermic injections. Trauma produces localized necrosis of subcutaneous fat. Lipodystrophy is usually more marked in the face and neck, but Bigler (1939) has reported a case involving the lower extremities only. In Dercum's disease the fat nodules remain unchanged for years. *Erythema nodosum*, *erythema induratum* and subcutaneous sarcoid of Darier and Roussy, as pointed out by Cummins and Lever (1938), may resemble the lesion, but the nodules in these diseases do not progress to atrophy of the fat without change in the skin. Dermatomyositis involves muscles as well as skin. The lesions of morphœa (circumscribed scleroderma) are plaque-like and leave the skin shrivelled and bound to the underlying tissues. The Weber-Christian syndrome presents the features of a clinical entity, but its pathological basis is not yet clear.

Summary.

A case is presented of relapsing febrile nodular non-suppurative panniculitis (Weber-Christian disease) in a female, aged sixty-eight years. The abdominal pain from which the patient from time to time complained could have been due to the presence of inflammatory adipose tissue of the abdomen, as described by H. Ungar (1946).

It is possible that this condition is more common in Australia than has been previously thought. No record of it appears to have been made in Australian literature. It is hoped that the reporting of this case may stimulate thought on this interesting but as yet not completely defined syndrome.

Acknowledgements.

My thanks are extended to Dr. K. B. Noad for his diagnostic assistance, and to the superintendent of Sydney Hospital and his clinical photographic staff.

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Reports of Cases.

A CASE OF WHOOPING-COUGH TREATED BY "CHLOROMYCETIN".

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BABY H., aged five months, a contact of whooping-cough, commenced to cough about January 24, 1950. The cough gradually grew worse, the baby became irritable and off colour, and by February 10 the cough was becoming grouped and the child whooped once.

"Chloromycetin" therapy was commenced on February 15, by which time the baby was whooping 15 to 20 times *per diem*, coughing a lot between whoops and vomiting the feeds. Table I shows the dosage of "Chloromycetin" and the number of whoops *per diem* until March 7, as well as the child's condition. An initial dose of "Chloromycetin" of 250 milligrammes (one capsule) was given. The powder was removed from the capsule and mixed with honey and no difficulty in administering it was encountered. A dose of 125 milligrammes was then given six-hourly until 2·0 grammes (eight capsules) had been given.

As can be seen, the baby rapidly improved, gained in weight and looked well, and by the fifth day was whooping only at night, on waking and if excited. The child remained well and had ceased whooping by the tenth day, when after a sudden cool change a relapse occurred on the eleventh day, and the condition was as bad as ever. On examination of the child next day (the twelfth), bronchitis was present. For the first time lung signs were found.

The baby was given sulphadiazine, rapidly improved again and in forty-eight hours was much better, not vomiting, and whooping only after waking or if excited. The lungs were clinically clear on the fifth day after commencement of sulphadiazine therapy, by which time the child was well and taking all feeds, had very little coughing and whooped only twice.

When weighed on March 7 the baby was eight ounces above the weight on February 7—a very satisfactory gain for the four weeks.

Two post-nasal swabs were taken on March 2, and no growth of *Hæmophilus pertussis* was obtained on a special

penicillin blood agar plate provided by the Institute of Medical and Veterinary Science, Adelaide.

In addition to the "Chloromycetin" and sulphadiazine therapy, the child had one drachm of *Mistura ad Pertussem* (Adelaide Children's Hospital Pharmacopœia) four-hourly and nasal application of "Neo-Synephrin hydrochloride" before feeds.

Thus, in this case the instant response to "Chloromycetin" in fairly severe whooping-cough was excellent. The relapse on the eleventh day almost certainly was due to a secondary infection and not to a recurrence of the pertussis. Its response to sulphadiazine and the child's rapid return to normal suggest this.

It seems that the dosage used was adequate in this case, but a slightly longer course may have prevented the complication.

In winter and changeable weather it may be advisable to follow the course of "Chloromycetin" with one of sulphadiazine or sulphamezathine to prevent complications.

TABLE I.

Date.	Dosage of "Chloromycetin". (Milligrammes.)	Number of Whoops.	Remarks
February 15	5.45 p.m., 250 11.45 p.m., 125	20	Vomited most feeds.
February 16	9 a.m., 125 1 p.m., 125 5 p.m., 125 11 p.m., 125	15	Vomited most feeds.
February 17	As on February 16	9	A fine warm day. Baby vomited once only.
February 18	As on February 16	15	A cool change in evening. Vomited twice—still bright.
February 19	9 a.m., 125	8	Vomited early morning, bottle only; very much better.
February 20	—	3	Whooped only at night—no vomiting.
February 21	—	4	Whooped twice at night, twice in the day when excited; no vomiting.
February 22	—	4	Vomited two ounces of 6.30 a.m. bottle.
February 23	—	3	No vomiting; baby seemed normal.
February 24	—	1	Very well.
February 25	—	0	Very well. A sudden cool change, in later evening.
February 26	—	17	Vomited once; condition as bad as ever.
February 27[1]	—	11	On examination bronchitis present, temperature 100° F. Sulphadiazine therapy commenced, 1·0 gramme *statim*, 0·5 gramme six-hourly.
February 28	—	9	No vomiting, but baby listless.
March 1 ..	—	5	Much better; livelier and taking food again.
March 2 ..	—	4	Post-nasal swabs taken. Lungs much clearer; moist signs in the bases.
March 3[2] ..	—	4	Very well.
March 4 ..	—	2	Very well; takes all food. Lungs clear.
March 5 ..	—	2	——
March 6 ..	—	1	Whoops on waking, and has some nasal discharge.
March 7 ..	—	1	——

[1] Sulphadiazine therapy started at 6 p.m.
[2] Sulphadiazine therapy discontinued at 10 p.m.

AGRANULOCYTOSIS FOLLOWING TREATMENT OF PARKINSON'S SYNDROME WITH "DIPARCOL" (DIETHYL-AMINO-ETHYL-PHENOTHIAZINE): A REPORT OF TWO CASES.

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FRENCH workers of Rhone-Poulenc introduced "Diparcol" for the treatment of the hypokinetic manifestations of disease of the extrapyramidal nervous system. The toxic effects to be expected are somnolence and vertigo in varying degree. Rarely overdosage gives rise to a temporary complete paralysis or to aggravation of Parkinsonian symptoms. A fatal case of agranulocytosis was reported in the French literature, but it was considered to be due to other drugs used at the same time (*Thérapie*, 1947). They advised then that an "occasional check of the leucocyte count is probably desirable". Sudden withdrawal of the drug was said to precipitate an exacerbation of symptoms (editorial comment in *British Medical Journal*, 1949).

Another fatal case of agranulocytosis following the use of "Diparcol" for post-encephalitic Parkinsonism of fourteen years' duration in a woman, aged fifty-eight years, is reported by Meek (1949). The drug was taken for two months in increasing doses up to one gramme daily. The dose was decreased to 400 milligrammes daily during the week prior to the development of a sore throat. The patient died two days later, and autopsy revealed depressed granulopoietic marrow.

The ætiology of granulopenia or agranulocytosis is obscure. The generally accepted view is that a granulotoxic drug, by causing fewer granulocytes to be formed, leaves the way open for infections to develop unhindered. Robertson (1949) favours the opposite view, that overwhelming infections occur while the patient is taking granulotoxic drugs, and he advises that the cardinal aim in treatment is to overcome the infection. Granulocytopenia occurs sometimes when no toxic agent can be demonstrated, and when as yet we are unable to demonstrate any deficiency of granulopoietic factors.

It has been stated (Nixon, Eckert and Holmes, 1943) that, when granulocytopenia follows sulphonamide therapy, the drug should not be suspended, but higher doses should be given to overcome the infection. The validity of this contention has not been proved or disproved, since sulphonamides have been replaced by penicillin as the drug of choice in the treatment of many infections, including those associated with agranulocytosis.

Case I.

L.F., a married woman, aged sixty-three years, was admitted from the out-patient department of another hospital to the Professorial Medical Unit of the Royal Prince Alfred Hospital on October 1, 1949, complaining of a sore throat, ulcers of the mouth and an infected right eye, all of two weeks' duration. Her throat was painful on swallowing and she had noticed painful, yellow, sloughing ulcers, the largest being on the lower gum in the front of the mouth. For about two years she had been worried by trembling of her forearms and legs, and had noticed some stiffness in the limbs. This was of very gradual onset over a longer period. The condition was diagnosed as Parkinson's syndrome, and for this she had tablets of "Diparcol" over a period of two and a half months. She was given increasing doses, up to 24 tablets daily of the smaller (50 milligramme) tablets, or the equivalent of the larger (250 milligramme) tablets; thus, the maximal daily dosage was 1·2 grammes. This dosage is within the limits recommended by the distributors of the product. There was no previous history of similar symptoms, nor of any infective process preceding the onset of the tremor and rigidity.

Examination of the patient on her admission to hospital showed her to be an elderly woman, slightly dehydrated and cyanosed, who weighed 133 pounds (60 kilograms). There was a coarse tremor of both right extremities, noticeable when she was interviewed, but absent when she was in repose. Examination of the right eye revealed some blepharitis and conjunctivitis. In the mouth there was an ulcer, four centimetres by one centimetre in extent, with a yellow sloughing base, over the free margin of the anterior part of the lower alveolus and lying between the everted lower lip and the base of the tongue. The pharynx was reddened, but no membrane was seen. The voice was husky. There was slight swelling of the submental and submaxillary lymph glands. Examination of the cardio-vascular system, the lung fields, the abdomen and lymph glands other than those mentioned, revealed no abnormality. There was rigidity of the limbs (of the "cogwheel" type), more pronounced on the left side. Examination of the skin revealed a purpuric rash on the forearms and shins.

Examination of the blood prior to her admission to hospital gave the following information: the erythrocytes numbered 3,300,000 per cubic millimetre, the hæmoglobin value was 63% and the leucocytes numbered 1950 per cubic millimetre, of which 9% were polymorphonuclear leucocytes. On her admission to hospital on October 1, 1949, the white cell count was 1480 per cubic millimetre, all cells being mononuclear—that is, complete agranulocytosis was present.

The temperature was normal on her admission to hospital, but an intermittent fever was present, with nocturnal exacerbations, the temperature ranging between 99° and 103° F. (37° and 39·5° C.). A week later the temperature had risen to between 101° and 104° F. (38° and 40° C.). Treatment with penicillin, 50,000 units given by intramuscular injection every three hours, and "Pentnucleotide", 10 millilitres given intramuscularly every six hours, was begun on her admission to hospital. Two transfusions of citrated blood were given—one litre on her admission to hospital and half a litre five days later.

Her clinical condition improved on October 8, in that she was less febrile, more restful and able to take food and drink more willingly. Serial blood counts first revealed polymorphonuclear leucocytes on October 10, when 2% were present. The mononuclear leucocytes decreased to a minimal level of 750 per cubic millimetre on October 5, increasing again to about 1000 per cubic millimetre in the subsequent counts. The hæmoglobin value was maintained at 13·9 grammes *per centum* or higher.

On October 14, and on three subsequent occasions at weekly intervals, the leucocyte count revealed a normal number and distribution of cells.

A urinary infection occurred simultaneously with the fever. Hæmolytic *Bacterium coli* was grown in large numbers from the urine. The patient recovered from this infection without sulphonamide therapy, but the urine was kept alkaline by the prescription of a potassium citrate mixture.

On October 21 a fine macular erythema appeared on the trunk and the adductor aspects of the limbs; penicillin was suspended, and the rash disappeared in two days. Her further convalescence was uneventful.

Since the day prior to her admission to hospital no "Diparcol" had been taken, but despite warnings issued by the distributors of this substance, no untoward neurological effects were noted.

Case II.

V.S., a married woman, aged thirty-four years, was admitted to the Professorial Medical Unit of the Royal Prince Alfred Hospital on October 18, 1949, complaining of ulcers on the roof of the mouth, sores on the lips and nose, and a sore throat—all of two weeks' duration—and of bruises and spots under the skin of the arms and legs, present for a week, and of blurred vision of the left eye for three days. During the two weeks prior to her admission to hospital, the ulcers and sores had become more painful and had then tended towards healing. The bruises and spots followed a shivering attack.

In 1942, after an attack referred to as "influenza", a tremor had developed in the right arm and leg. This became much worse until, in 1947, a craniotomy was performed at this hospital, in which it is understood an area of premotor cortex was resected. There followed a week of flaccid paralysis, then voluntary movement was restored, and for six months relaxation of the limbs on the right was possible and the tremor was much reduced. At that stage epileptiform seizures began occurring every three months, in which the right arm became stiff and consciousness was lost for about fifteen minutes. These were controlled by the taking of "Dilantin". The patient's hearing deteriorated at this time.

In October, 1948, "Diparcol" treatment was commenced, with a dosage increasing up to 20 tablets daily—that is to say, one gramme daily. In December, 1948, a scaly red rash appeared on the hands, forearms and feet. This decreased when the dosage of "Diparcol" was reduced. In April, 1949, bruising of the legs was noticed for several days.

Examination of the patient on her admission to hospital (October 18, 1949) showed her to be a pale, thin woman with crusted ulcers on the lower lip and round the left nostril. Punctate hæmorrhages were seen on the alveoli and on the soft palate, but no ulceration was seen. There was a large bruise over the left shin, and on the inner aspects of both arms small subcutaneous hæmorrhages were present. The right upper cervical lymph glands and those of the left occipital group were enlarged, but the axillary and inguinal lymph glands were normal.

Examination of the cardio-vascular system, the abdomen and the lung fields revealed no abnormality.

There was a coarse tremor of the right arm and leg, which was also affected by flaccid paresis. All tendon reflexes were exaggerated except the right biceps and triceps reflexes. The plantar reflexes were normal, but the abdominal reflexes were absent. Her weight was 85 pounds (38 kilograms). Her temperature was 101° F. (38·3° C.) on her admission to hospital. The urine contained a small amount of albumin.

A blood count a week prior to her admission to hospital showed 8000 leucocytes per cubic millimetre, 1% being polymorphonuclear cells. On her admission to hospital, the leucocytes numbered 1400 per cubic millimetre, 2% being polymorphonuclear cells; in addition, the erythrocytes numbered 1,530,000 per cubic millimetre, the hæmoglobin value being 4·4 grammes *per centum*. The blood picture could be variously interpreted as that of aplastic anæmia, leuchæmia or granulocytopenia complicated by severe blood loss.

Treatment consisted of repeated transfusions of citrated blood almost continuously, so that five litres were given in the first seven days; penicillin was given in doses of 50,000 units every three hours (increased after twenty-four hours to 200,000 units every three hours) by intramuscular injection, and "Pentnucleotide" was given in doses of 10 millilitres intramuscularly every six hours. Sedation with chloral hydrate and paraldehyde was given.

The temperature, at first steady at 101° F. (38·3° C.), after a day became hectic for two days with readings of 105° and 105·8° F. (40·5° and 41° C.); it then fell by lysis for four days to a level of about 100° F. (37·7° C.). During this period, streptomycin (0·5 gramme twice daily) was given intramuscularly. At this stage the question of giving "Dilantin" was considered in view of the possibility of severe epilepsy, but the suggestion was rejected for the time being, since this drug has been associated with granulocytopenia, and the patient's general condition appeared slightly better.

On October 24 jaundice appeared, with very dark urine, which contained erythrocytes, hæmoglobin and bilirubin. Further purpuric spots appeared in all areas, and there was a slow but steady loss of blood from the reproductive tract. Examination of the blood showed about 10 grammes *per centum* of hæmoglobin, 500 leucocytes per cubic millimetre, complete absence of granulocytes and 165,000 platelets per cubic millimetre.

The patient passed into a stuporose state with delirium, the temperature being between 101° and 102° F. (38·3° to 38·8° C.). After two days in this condition, she died nine days after her admission to hospital.

A sternal puncture was performed two hours after death and smears from the material obtained were stained with Leishmann's stain. The smears stained moderately well, and the cytology of the bone marrow showed active erythropoiesis of normoblastic type. There was almost complete absence of leucopoietic tissue. The only leucocytes seen were scattered lymphocytes. The appearances suggested that there was a complete aplasia of the leucopoietic tissue.

Autopsy.

A thoraco-abdominal autopsy was performed by Dr. L. Carter, who reported the following findings.

The body was that of a young woman who appeared to be about the stated age. Examination of her skin revealed numerous petechial hæmorrhages, which were most pronounced on the limbs and left upper eyelid. The skin was moderately jaundiced.

The thyreoid gland was normal.

Examination of the thymus and mediastinum revealed some slightly enlarged lymph nodes in the posterior mediastinum. No other abnormality was seen.

The right lung weighed 260 grammes and the left lung 230 grammes. In these a few hæmorrhages into the substance were found. The hæmorrhages varied in diameter from one or two millimetres to several centimetres and were confined to the lower lobes. One hæmorrhagic area at the edge of the lower lobe in the right lung was harder and darker; the appearance was not unlike that due to a small infarct. The remainder of the lung substance was normal.

The heart weighed 240 grammes. There were a few subpericardial petechial hæmorrhages, and the pericardium contained a little yellow fluid. The heart muscle was flabby, and the wall of the right ventricle was thin. The tricuspid orifice was dilated. The valves were normal. The blood was unusually fluid, and practically no clotting had occurred. In the aorta only the very earliest atheromatous changes were present.

The spleen weighed 145 grammes, and no obvious abnormality was detected in it.

The liver (1400 grammes) appeared slightly enlarged, was rather paler than usual and had a suggestion of nutmeg appearance. There was no obstruction in the biliary passages.

The gall-bladder was normal.

The œsophagus was covered by a cracked, friable, chocolate-brown membrane, which could be removed easily to reveal smooth mucosa. The membrane was thought to be altered blood.

The stomach contained mucus and altered blood. There were submucous hæmorrhages of varying size. In some places hæmorrhage had occurred into the mucosa at the crests of the rugæ. Part of the mucosa had ulcerated, the ulcers being one to three millimetres in diameter.

There were submucous hæmorrhages in the large intestine.

The pancreas was normal.

The suprarenals appeared slightly smaller than usual, but were otherwise normal.

The lymph nodes in the inguinal, axillary and cervical regions did not appear to be enlarged. The para-aortic glands and those around the common iliac vessels were moderately enlarged, and the cut surface was of a reddish colour resembling splenic tissue in appearance.

The right kidney weighed 207 grammes and the left kidney 167 grammes. These were congested, but were otherwise of normal appearance. Blood clot occupied the pelvis of the right kidney.

The ureters were normal.

In the bladder a few submucous hæmorrhages were found, but otherwise it appeared normal.

The uterus was not enlarged. The cervix was softened, and the os dilated to admit one finger. The cavity of the uterus contained a blood clot. The endometrium did not appear abnormal, and no cause for the bleeding was apparent.

The right ovary contained a small cyst 1·5 centimetres in diameter, filled with clear, yellow fluid. The left ovary contained a hæmorrhagic *corpus luteum*.

The brain and long bones were not examined, because permission was not obtained for these examinations.

The bone marrow of the vertebral bodies was red in colour and of normal appearance.

The microscopic findings were as follows. The bone marrow (from a vertebral body) was packed with hæmatopoietic cells, which were almost exclusively red cell precursors. No cells of the granulocytic series could be identified. In the kidney mild arteriosclerotic changes were present—patchy granular fibrosis and small areas of lymphocytic infiltration. In some glomeruli blood was present in Bowman's capsule, and blood was found in the lumen of many tubules. Examination of the hæmorrhagic area in the right lung showed the alveoli to be filled with blood. No evidence of infarction was seen. In the section from the left lung also an area of hæmorrhage was seen. In other parts of this section there was infiltration of the alveolar walls and of the lumen by macrophages and lymphocytes. Practically no polymorphonuclear leucocytes were present. In the colon no abnormalities were found.

Comment.

In Case I, the urinary tract infection due to a hæmolytic strain of *Bacterium coli* was overcome completely without the exhibition of drugs to which the organism was sensitive. Presumably the patient's throat infection was controlled by penicillin, and as the marrow recovered the granulocytes produced by it, aided by those added to the patient's blood by transfusion, were sufficient to overcome the urinary infection. This example weakens the case for the protagonists of infection as the primary factor in causing agranulocytosis. In those cases of agranulocytosis without a demonstrable toxin as the cause, there is no evidence that the organism is specially virulent; in fact, the ætiology is unknown.

No neurological crisis was precipitated, even though the drug was withdrawn completely, despite the recommendations of the distributors.

Clinical improvement was noticed on the eighth day of treatment, and anticipated by two days the reappearance of granulocytes in the blood. Presumably this indicated that granulocytes were being produced but were utilized so rapidly that none were to be seen in the peripheral blood.

In this case the risk of agranulocytosis was not apparent, and the dosage of the drug was about 20 milligrammes per kilogram of body weight. The patient stated that 0·2 gramme daily was just as effective as 1·0 gramme daily; but although the rigidity was relieved, an attempt was being made to relieve the tremor to a greater extent, and thus the dosage was increased above what we now realize was a safe level.

In Case II, factors which militated against the patient's recovery were, firstly, failure to reduce the dosage, in spite of two warnings—the rash of December, 1948, and the hæmorrhagic episode of April, 1949, and secondly, delay in commencing treatment of the granulocytopenia until a week after the condition was recognized.

Besides granulopenia, there was purpura from damage to the capillary endothelium, by the drug itself, by toxic products of the infective process, or by bacteriæmic emboli.

The terminal jaundice which supervened was not classified clinically, because the presence of red cells and hæmoglobin in the urine rendered tests for bile unreliable. Evidence from the autopsy did not assist in deciding this point.

The autopsy indicated that the erythropoietic marrow was not depressed, but that there was an absence of granulocytopoiesis. Thus the anæmia was secondary to

hæmorrhage, and not due to aplasia of the marrow. The presence of platelets in moderate number towards the terminal stages could not be explained by their being derived from transfused blood, and was evidence against aplasia of the marrow.

The dosage of "Diparcol" in this case was about 25 milligrammes per kilogram of body weight. As in Case I, relief of rigidity was noticed while only a small dosage was employed (about 0·2 gramme daily), but higher dosage was given in order to relieve the tremor more completely.

The question of abandoning "Diparcol" completely in the treatment of Parkinson's syndrome will have to be decided. If there were no other diethyl-amino-ethyl compound available, it seems that its use could well be continued at a lower dosage level than that recommended by its distributors, and with due regard for the granulopoietic tissue. The advent of the phenyl-cyclopentane compound, which promises to be much safer, will probably render the phenothiazine compound obsolete, provided that the phenyl-cyclopentane compound is effective in relieving spasticity.

Structural Relationships of Drugs Used in Diseases of the Extrapyramidal Motor System.

The chemistry of such apparently different alkaloids as cocaine, atropine, quinine, papaverine and their derivatives has been the subject of an intensive research over the past fifteen or more years, most advanced in France in the laboratories of the *Institut Pasteur* and the firm of Rhone-Poulenc, but closely followed by German, American and British research. This has led to the synthesis of many new drugs, often superior to their prototype, or else combining the desirable effects of more than one alkaloid.

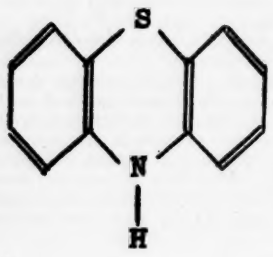
The pharmacological characteristics that are likely to be shared by any of these compounds are (i) acetylcholine-like (parasympathomimetic); (ii) atropine-like; (iii) analgesic; (iv) local anæsthetic (Ing, Dawes and Wajda, 1945); (v) quinidine-like (Dawes, 1946); (vi) antihistaminic (Dews and Graham, 1946).

As examples of the multiple effects, we find that, compared with quinidine for its effect on cardiac muscle, "Decicain" (amethocain) is ten times as active, 1262F. (diethyl-amino-ethoxy-2-diphenyl) is five times as active, and "Neoantergan" ("Anthisan") is twice as active. As local anæsthetics, "Anthisan" is three times as active, and pethidine, 1262F. and "Parpanit" are equally as active as procaine.

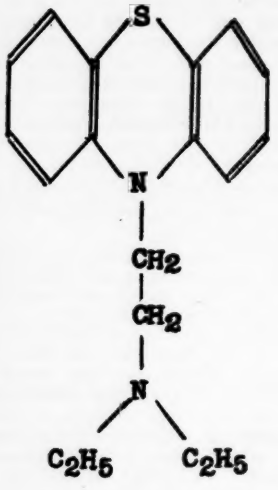
It follows that, by selecting the drugs that have the property of relaxing rigidity in spastic skeletal muscle, but without the parasympathetic-paralysing action of atropine, we have effective drugs for use in Parkinson's syndrome. The tremor of Parkinson's disease is usually lessened but not abolished as effectively as is the rigidity; nevertheless it is the rigidity which incapacitates the patient, and relief of this symptom usually changes the patient's outlook completely.

The synthetic spasmolytics recommended are pethidine, "Parpanit", "Syntropan" (Domenjoz, 1946), "Trasentin" and "Diparcol". These substances are frequently diethyl-amino-ethyl esters of various nuclei, and differ from most antihistaminics only in the side-chain, which is usually dimethyl-amino-ethyl in the latter. An example of this similarity is seen in the case of "Diparcol" and "Phenergan" (a recently introduced antihistaminic), in both of which the nucleus is the relatively toxic phenothiazine group (see diagram). The small dosage for "Phenergan" as an antihistaminic, as compared with "Diparcol", makes it relatively safe. Phenothiazine is widely used as a vermifuge in veterinary practice, but its use in medicine has been abandoned, owing to the high incidence of agranulocytic episodes following its use.

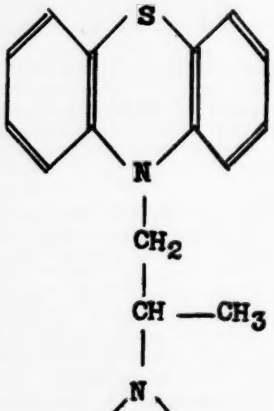
"Parpanit" is chemically similar to "Diparcol", in that the structure of the side-chain is the same, but the nucleus is phenyl-cyclopentane-1-carboxylate. This is a much less toxic nucleus than phenothiazine. It has been available in Sydney for only a few weeks and is undergoing clinical



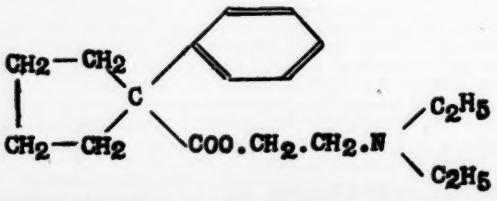
Phenothiazine.



"Diparcol": Diethyl-amino-ethyl-phenothiazine.



"Phenergan": 10 - β - dimethyl - amino - propyl-phenothiazine.



"Parpanit": Diethyl-amino-ethyl ester of 1-phenyl-cyclopentane-1-carboxylic acid.

trials at this hospital (January, 1950). From overseas, enthusiastic reports of its success have been forthcoming (Schwab and Leigh, 1949).

An interesting pharmacological discussion is in progress, in view of the fact that, unlike curare, these "anti-rigidity" or spasmolytic drugs are not counteracted by "Prostigmine", which suggests that the action is not at the motor end-plate of the myo-neural junction.

Side actions include giddiness, nausea and epigastric burning. The two last-mentioned are relieved by adequate dilution of the drug when taken orally. The giddiness, like that seen with "Benadryl", which is very similar in structure, appears to be sensory in type and is associated with inhibition of proprioceptive sensibility, resulting in weakness, poor judgement of distances and a sense of unreality. When dosage is being increased up to an effective therapeutic level, giddiness is the symptom to be watched for to indicate the maximal tolerated dose.

A case of *myotonia atrophica* responding dramatically to "Benadryl" is reported by Bussell (1949). It is considered that the mode of action of these drugs is probably by lengthening the refractory period of muscle, so that it is unable to maintain a tetanus. Bussell suggests that quinine-like drugs which are of value in myotonia may also be beneficial in the rigid type of Parkinsonism.

Summary.

1. The recent occurrences of death in "Diparcol" agranulocytosis are reviewed.

2. Two cases of agranulocytosis following the use of this drug for Parkinson's syndrome, one fatal, are reported, with one autopsy report.

3. Ætiological factors and the advisability of discarding this drug in favour of another diethyl-amino-ethyl compound are discussed.

4. "Diparcol" at a daily dose of 25 milligrammes per kilogram can cause fatal agranulocytosis, and at 20 milligrammes per kilogram daily, grave granulocytopenia.

5. Some aspects of the pharmacology of this and related drugs are presented.

Acknowledgements.

I wish to thank Professor C. G. Lambie for permission to report these cases; Dr. E. F. Thomson of the Fairfax Institute; and Dr. L. Carter of the Department of Pathology, University of Sydney, for the autopsy report; and other members of the staff of the Royal Prince Alfred Hospital and the Department of Medicine, University of Sydney.

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Reviews.

THE LIVER AS THE GATEWAY OF DISEASE.

THEORISTS still endeavour to find a solution to the causation of disease, neglecting in greater or less degree the evidence of biologists, biochemists, physiologists and pathologists; and Kasper Blond and David Haler in presenting a book entitled "The Liver: Porta Malorum (The Gateway to Disease)", refuse in addition to accept any evidence obtained by autopsy.[1] Liver biopsy is apparently unknown to them. A biased interpretation of clinical phenomena is given as evidence in support of their thesis that the liver and portal hypertension are the primary sources of affections of the alimentary tract (from peptic ulcer to appendicitis), pancreas, gall-bladder, spleen and kidneys, and of *angina pectoris*, hypertension, bronchial asthma and toxic goitre, as well as of toxæmia of pregnancy, hæmorrhoids, *fistula-in-ano* and varicose veins of the leg.

There is no certainty regarding the physiology of the gall-bladder and the ætiology of gall-stones and the authors produce no evidence which clarifies the position. Portal hypertension and porto-caval anastomosis are well recognized phenomena which, however, are adduced as the cause of acute nephritis, *angina pectoris*, myocardial fibrosis, bronchial asthma, toxic goitre *et cetera*.

The arguments are sometimes ingenious, but we are firmly of the opinion that time spent in reading the book is time wasted.

A MONOGRAPH ON THE AORTA.

THE monograph "Diseases of the Aorta: Diagnosis and Treatment", by Nathaniel E. Reich, is presented because "rapid progress has occurred in the diagnostic and therapeutic aspects of this part of the cardio vascular system".[2] There is an introductory chapter, with an historical section, and then follow sections on anatomy, histology, embryology and physiology. Subsequent chapters deal respectively with congenital anomalies of the aorta, atherosclerosis, syphilis, diseases of the aortic lumen, dissecting aneurysms, occlusions and rare diseases. Final chapters deal with diagnostic procedures and certain special aspects of treatment, such as the value of the antibiotics and anticoagulants.

The principle difficulty with this book is that it deals primarily with diagnosis and treatment without proper consideration of the diseases to which these refer. There is thus inadequate consideration of the basic principles on which our knowledge must depend. In no part is there an adequate description of the diseases such as one would expect in a book of this kind. Furthermore, though a good deal of information is presented, it is scattered and does not occur in places where one might reasonably expect to find it.

In some parts the scope of the work is extended to cover diseases of the smaller vessels. Of course it is understood that this must be so when one is dealing with diseases of the aortic wall, but the discussion goes beyond what is necessary without any clear differentiation of changes in small and large vessels. Throughout, the discussion gives one the impression of being an aggregation of rapidly accumulated notes, rather than the careful presentation of the writer's considered views regarding the particular disease or diseases.

This results in a rather staccato style which is a little tiresome. As an example, the historical section contains considerable information and many points of interest, but the style is such as to be positively discouraging. However, if the reader can compel himself to persevere sufficiently, useful information will be obtained.

The best part of the book is that relating to the clinical aspects, the diagnostic procedures and the points about treatment. Here, however, as with the other parts, there is by no means as complete a statement of the problems as one would expect in a monograph which is devoting itself to such a small part of the body.

[1] "The Liver: Porta Malorum (The Gateway to Disease)", by Kasper Blond, M.D. (Vienna), L.R.C.P., L.R.C.S. (Edinburgh), L.R.F.P.S. (Glasgow), and David Haler, M.B., D.C.P. (London); 1950. Bristol: John Wright and Sons, Limited. London: Simpkin Marshall, Limited. 8" × 6", pp. 280, with 36 illustrations, some of them coloured.

[2] "Diseases of the Aorta: Diagnosis and Treatment", by Nathaniel E. Reich, M.D., F.A.C.P.; 1949. New York and London: The Macmillan Company. 9¼" × 6¼", pp. 308, with 60 illustrations. Price: 56s.

The book is printed in a type of modern kind, but there is considerable waste space in the presentation of the headings and subheadings. Altogether the presentation impresses one as being pretentious for the amount and value of the material put forward.

One point which is tedious is that X-ray films are recorded as "Plates" and all other illustrations as "Figures". These are both numbered consecutively but independently. Some statement of this peculiarity could have been made in the early pages and would have saved a good deal of time and trouble.

The book is printed on very good paper and the illustrations are reproduced very well, but the general arrangement of the book and the manner of presentation of the material itself suggest a lack of sense of proportion regarding the value of this particular contribution.

A YEAR BOOK OF PATHOLOGY AND CLINICAL PATHOLOGY.

THE practice of including a number of short articles on subjects of topical importance (contributed by qualified authors by invitation) is maintained in "The 1949 Year Book of Pathology and Clinical Pathology".[1] These short articles deal with the pathology of atom bomb casualties, the problem of early cancer, the physiopathology of cancer, and neoplasia in fishes, amphibians and reptiles. They are placed in a chapter on general pathology, which reflects in a wealth of abstracts the developments taking place not only in pathological knowledge, but in the basic concepts of the subject. The rest of the material in this section, which has been culled from a wide range of journals, is grouped on an anatomical basis. Australian authors represented include Noel C. Newton and V. J. McGovern, of Sydney.

The section on clinical pathology opens with a quoted definition, which may be repeated: "Clinical pathology is the practice of laboratory medicine. It consists of observing and measuring certain physical, physiological and chemical phenomena for the purpose of diagnosis or treatment and involves the correlation and application of results thus obtained." With this as his standard the editor of the section has collected some interesting material on hæmatology, clinical chemistry, liver function tests, serology, bacteriology, mycology, cytology, microscopy and apparatus. Mention is made of the benzidine test for occult blood in fæces, reported by H. W. Linn, of Adelaide.

This volume must be of considerable value to those whose primary interest is in the field of pathology, but it should be interesting and useful to many other medical practitioners, especially the physician and the general practitioner who prefers to go beyond the mere "rule of thumb" in understanding and managing his patient's ailments.

THE USE OF QUINIDINE IN HEART DISEASE.

"QUINIDINE IN DISORDERS OF THE HEART", by Dr. Harry Gold, is an excellent monograph on this much abused and ill-understood drug.[2] Gold first describes the indications for using the drug, its pharmacology, therapeutic actions and dosage, and then goes over each individual disorder for which quinidine is effective. He further explains the physiological mechanisms involved and how quinidine acts in each particular case, and why the drug is not effective in certain cases. The author rightly points out the dangers of not observing proper electrocardiographic control in the treatment of cardiac irregularities. The doses of quinidine recommended would seem to be large, but as the author points out in this book, this is a safe procedure when a true pharmacological understanding is obtained. There is a special chapter on anæsthesia and surgery which should be of interest to the anæsthetist. Altogether this book is well worth reading.

[1] "The 1949 Year Book of Pathology and Clinical Pathology (January-December, 1949); Pathology, edited by Howard T. Karsner, M.D., LL.D.; Clinical Pathology, edited by Arthur Hawley Sanford, M.D.; 1950. Chicago: The Year Book Publishers, Incorporated. 7" x 4¾", pp. 544, with 161 illustrations. Price: $4.75.

[2] "Quinidine in Disorders of the Heart", by Harry Gold, M.D.; 1950. New York: Paul B. Hoeber, Incorporated. 8" x 5", pp. 132. Price: $2.00.

Books Received.

[The mention of a book in this column does not imply that no review will appear in a subsequent issue.]

"The Medical Clinics of North America" (issued every two months); 1950. Philadelphia and London: W. B. Saunders Company. Melbourne: W. Ramsay (Surgical) Proprietary, Limited. Nationwide Number. 9" x 6", pp. 306, with nine illustrations. Price: £7 5s. *per annum* (cloth binding) and £6 *per annum* (paper binding).

Consists of a symposium on medical therapeutics—twenty-three chapters contributed by thirty-five authors.

"Postgraduate Gastroenterology: As Presented in a Course Given Under the Sponsorship of the American College of Physicians in Philadelphia, December, MCMXLVIII", edited by Henry L. Bockus, M.D.; 1950. Philadelphia and London: W. B. Saunders Company. Melbourne: W. Ramsay (Surgical) Proprietary, Limited. 9¾" x 6¼", pp. 690, with 258 illustrations. Price: £4 15s.

The editor gives a list of fifty-three contributors, all of whom are teachers in medicine.

"Diseases of the Foot", by Emil D. W. Hauser, M.S., M.D.; Second Edition; 1950. Philadelphia and London: W. B. Saunders Company. Melbourne: W. Ramsay (Surgical) Proprietary, Limited. 9" x 6", pp. 432, with 195 illustrations. Price: 66s. 6d.

Concerned chiefly with "functional treatment".

"Modern Trends in Orthopædics", edited by Sir Harry Platt, M.D., M.S., F.R.C.S.; 1950. London and Australia: Butterworth and Company (Publishers), Limited. 9¾" x 7", pp. 504, with 222 illustrations. Price: 59s.

A member of the "Modern Trend" series and comprising fourteen chapters by various contributors.

"Studies on Tumour Formation", by the late G. W. de P. Nicholson, M.A., M.B., B.Ch.; 1950. London and Australia: Butterworth and Company (Publishers), Limited. 9¾" x 7", pp. 648, with 184 illustrations. Price: 82s.

Consists of "Tumour Studies" reprinted from *Guy's Hospital Reports*.

"Malignant Disease and its Treatment by Radium", by Sir Stanford Cade, K.B.E., C.B., F.R.C.S., M.R.C.P., with a foreword by Sir Ernest Rock Carling, F.R.C.P., F.R.C.S., F.F.R.; Volume III; Second Edition; 1950. Bristol: John Wright and Sons, Limited. London: Simpkin Marshall, Limited. 9" x 6", pp. 458, with 182 illustrations, some of them coloured. Price: 52s. 6d.

Deals with the common neoplasms of the breast and thorax, the abdomen and pelvis, and the male and female external genitalia.

"The Essentials of Materia Medica, Pharmacology and Therapeutics", by R. H. Micks, M.D. (Dublin), F.R.C.P.I.; Fifth Edition; 1950. London: J. and A. Churchill, Limited. 8" x 5¼", pp. 448. Price: 21s.

Planned to teach the junior student the principles of drug therapy and to provide guidance for the senior student and physician in the administration of drugs.

"The Care of Children: From One to Five", by John Gibbons, M.B. (Cambridge), M.R.C.P. (London); Fourth Edition; 1950. London: J. and A. Churchill, Limited. 7" x 5", pp. 214, with a few illustrations. Price: 5s.

The third edition has been revised and a new chapter on feeding errors and difficulties has been added. The section on common diseases of childhood has been expanded.

The Medical Journal of Australia

SATURDAY, AUGUST 19, 1950.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given without abbreviation: surname of author, initials of author, year, full title of article, name of journal without abbreviation, volume, number of first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction are invited to seek the advice of the Editor.

THE UNIVERSITIES OF AUSTRALIA.

WHEN Professor G. W. Pickering, of London, returned to England after his journeyings across the world in 1949 as Sims Commonwealth Travelling Professor, he presented a report to the presidents of four colleges—the Royal College of Physicians (of London), the Royal College of Surgeons (of England), The Royal Australasian College of Physicians and the Royal Australasian College of Surgeons. This report is an important and valuable document. Professor Pickering did not waste his time in Australia and New Zealand; he had a discerning eye and some of his observations point the way to necessary reforms. One or two of his statements, however, may be questioned, and the extracts published from the report in *The Lancet* of May 27, 1950, are unfortunately chosen in such a way that they may create a wrong impression. These facts and the knowledge that far-reaching changes in university liaison and finance in Australia are imminent make reference to the subject in these pages imperative.

Clarity will best be served if the following paragraph on university finance is quoted from the report.

> Apart from endowments (trivial in New Zealand) and student fees (no fees in West Australia) Universities are financed by Government. In New Zealand, the four University Colleges have up to now made separate application for financial aid to the Dominion Government. In Australia, aid is sought by each University from its State Government, though the Federal Government has made appropriate grants to cope with returned soldiers. Before World War II Government aid seems to have been on a scale at least comparable with, and in some cases superior, to that in Great Britain. But since the war, the problem has been more energetically tackled in Great Britain and help more generously given. Thus in Australia, the University of Sydney with over 10,000 students receives less than £150,000 p.a. from the New South Wales Government, and Adelaide with 4,000 students receives £53,000 p.a. In certain places there is a distinct tendency for the State to interfere in University affairs, and a fear that aid from the Federal Government might bring political pressure from that quarter. In New Zealand a University Grants Committee has been set up, consisting of the Chancellor, Pro-Chancellor, Vice-Chancellor and four persons nominated by the four constituent divisions of the University. It had not begun to work at the time of our visit. In Australia no such committee is yet in being. The University position in both countries is much less satisfactory than in Great Britain where the University Grants Committee provides an instrument which is sensitive enough to interpret University needs without undue delay, and which provides for financial assistance on a relatively generous scale from the Government, while at the same time insulating the Universities from purely political pressure.

From his statement that each Australian university seeks financial aid from its State Government, Professor Pickering seems to be aware that education in Australia is a State and not a Commonwealth responsibility—each State has its Minister and its Department of Education (or Public Instruction). It is a pity that he did not explain this in his report. Had he done this, the reference in *The Lancet* might have been fuller. *The Lancet* states that Professor Pickering detected two "fundamental weaknesses". The first was the absence of a body analogous to the University Grants Committee of Great Britain and it is stated also that there was no promise of such a reform. (The other we shall not mention on this occasion.) Readers of *The Lancet* may be forgiven for thinking that we in Australia are stupider than we really are. The State control of education has been a barrier to complete cooperation between State educational bodies. Until quite recently the only liaison between the several universities in Australia was the conference of vice-chancellors which took place from time to time for the discussion of common problems. Early in 1950 a secretariat was formed at Canberra in order to provide a liaison between all the universities in the Commonwealth. It is supported by contributions from the several universities and there is no doubt that it will prove to be a useful body in the future. It may even turn out to be akin to the University Grants Committee of Great Britain, if certain proposals to be made at the next Premiers' Conference are carried into effect. Most people connected with university education in Australia realize that the States cannot shoulder the whole burden of their universities—it is common knowledge that State treasurers are always looking for more money from the Commonwealth Government which is the main financial source of supply to Australian State governments. We understand that proposals will be made for the payment of direct subsidies from the Commonwealth Treasury to State universities. This is certainly a move in the right direction, and if the proposals are adopted they will have the hearty approval of all Australians concerned in education, and, we should imagine also, of Professor Pickering.

Professor Pickering states that there is in certain places a distinct tendency for the State to interfere in university affairs. We are at a loss to know to what he refers, and inquiry has failed to reveal any facts that would support the statement. It is true that governments have nominees on the controlling bodies of universities (senate or council), but such nominees, even if they would, could not alter the policy of a university to its detriment. Possibly Professor Pickering has translated the fears of certain persons into facts. The danger of sweeping generalizations is shown in the last paragraph of the report. In the last paragraph but one Professor Pickering deplores what he regards as the inadequate training of the more highly placed civil servants. He looks on this as a very serious

defect and goes on in the last paragraph to state that the defect was very obvious in the university affairs of the Dominions as he saw them. "For the Universities were very poorly supported financially and had to settle many of the smallest details of their programmes with civil servants who had no real knowledge of the function or purpose of a University." We can imagine the wrath and indignation of vice-chancellors and deans of faculties when they read that statement, if they ever do.

Having drawn attention to proposals likely to be made for the granting of subsidies to universities by the Commonwealth Government, we think it well to show that the Commonwealth is extending its interest and its activities in connexion with university education. The reference is to the Commonwealth scholarship scheme which will come into operation on January 1, 1951. This scheme, which by the way will appropriately be introduced on the day marking the fiftieth anniversary of the federation of the Australian States, must be regarded as showing a desire to extend university education to the most capable boys and girls of the country without consideration of their financial or social status. It should not be seen as a future lever for the handing over of the control of universities to unlearned and intellectually myopic civil servants. Under the new scheme 3000 entrance scholarships will be available each year to boys and girls who wish to undertake courses at universities and similar institutions. The scholarships will be awarded entirely on merit on the results obtained by applicants at approved examinations. The 3000 scholarships will be divided among the States on a population basis. The courses approved under the scheme will cover a wide range and will include all first degree courses and certain diploma courses at universities, courses at certain standards at technical colleges and schools of mines, and certain other professional courses. The approved courses will include full-time as well as part-time courses, and in certain circumstances a student may be allowed to undertake a full-time course on a part-time basis. In general, a scholar will be permitted to apply his scholarship to any one of the approved courses. Winners of scholarships will be entitled to payment of tuition fees and certain other compulsory expenses without any regard to the income of their parents. If a student undertakes a full-time course he may apply for a living allowance which will be payable subject to a means test. It is of interest also to note that a student who is awarded a Commonwealth scholarship will be required to undergo a medical examination. From this information it is clear that the Commonwealth Government is fathering a commendable scheme of scholarships. It is already doing a good deal for the education and training of ex-service personnel, but this new scheme deals with a group of younger persons. It seems safe to assume that the Commonwealth Government will not be unmindful of its obligation to universities in respect of the extra expense brought about by the new scholarship scheme; moreover, since the new scheme may be taken as a sign of a lively interest in education, the supposition is justified that the universities will not be allowed to struggle on in their impoverished state. To say the least of it, this state is not conducive to education in the true sense of the term; nor does it make for the efficiency of the people of Australia as a nation.

Current Comment.

IMMUNITY IN PLAGUE.

IN the past, plague has been perhaps the most terrifying of all infectious diseases, and its history is common knowledge. It ravaged the Roman Empire in the sixth century, destroyed half the population of the eastern provinces, swept over Europe under the name of the Black Death in the fourteenth century; and in this and succeeding epidemics killed millions. Only recently has it been controlled by strict quarantine. Even of late years localized epidemics have continued to occur, especially in Asia. Within the last ten years, however, three phases of the problem of plague have undergone a complete change. K. F. Meyer,[1] from the George Williams Hooper Foundation, University of California, discusses some recent studies of immunity in plague in the thirty-second Mellon Lecture presented before the Society for Biological Research, School of Medicine, University of Pittsburgh. He states that with the advent of the newer therapeutic tools—sulphadiazine, sulphamerazine and streptomycin—treatment of plague is no longer the hopelessly futile matter it once was. Pollitzer in 1949 showed that the average mortality percentage in clinical bubonic plague in one area at least had tumbled from 85% to as low as 6%. It is hoped, too, that these drugs may be useful in the prevention of disease in those who have been exposed to infection. Even the dread pneumonic form of plague may eventually be controlled. The two major ways of controlling epidemics have also changed since the introduction of powerful new insecticides and rat poisons. Meyer believes that, providing DDT and its derivatives and "1080" and similar rat poisons are applied on an adequate scale, urban plague can be promptly suppressed. Incidentally, if this is so, why do we not rid our cities of their large population of rats and fleas without waiting for the threat of an epidemic?

There is, however, another aspect of the problem of plague that remains unsolved. Despite the extensive work that has been done, no agreement has been reached as to the mode or even the value of antiplague inoculation. Statistical analysis of results of large-scale inoculation is impossible because it is difficult to determine the degree of exposure to infection. The mechanism of immunity is still uncertain. Plague, however, is primarily an infection of rodents, and only secondarily an infection of man. It is believed, therefore, that the study of the infective process in rodents will probably lead to an understanding of immunity in man. Throughout the years the search for an effective practical prophylactic against plague has been based on this assumption. Most workers have adhered to the principle that if a vaccine preparation or fraction of *Pasteurella pestis* is found to protect mice, rats and guinea-pigs against an experimental infection, very good presumptive evidence of its efficacy for man has been established. Three types of prophylactic inoculation have been studied; firstly the use of vaccines prepared from killed bacilli, secondly the use of antiserum, and thirdly inoculation with living avirulent strains of *Pasteurella pestis*. The value of a single injection of dead plague bacilli has been seriously questioned. It is true that moderate protection can be secured and maintained with chemically killed, detoxified plague bacilli, but the amount of material required is such that the local and systemic reactions are extremely severe. As regards antisera, the position does not seem to be quite clear. The therapeutic and prophylactic value of antiplague serum has been recognized since 1895 when Yersin, Calmette and Borrel showed that the serum of rabbits immunized with inactivated cultures protected other animals against infection. Up to 1940 the antiplague horse serum of the Haffkine Institute of India and the Research Laboratory of South Africa contained approximately 65 mouse-protective units per millilitre. Preparations made during the war by two American manufacturers provided antiplague globulin solutions with a mouse-protective unitage of as high as

[1] *The Journal of Immunology*, March, 1950.

1569 mouse-protective units per millilitre. It has been shown that only 60% of guinea-pigs are protected by such sera, so that their usefulness is limited. On the whole, the evidence available today favours the third method, the use of avirulent living plague vaccines as the most dependable prophylactic measure. There has been a striking decline in the plague mortalities in Java and Madagascar, where these newer methods of vaccination have been tried on impressive scales. Meyer believes that in plague, as in tuberculosis and brucella infections, the living *Pasteurella pestis* leaves a more permanent imprint on the antibody-producing cells and their descendants than do soluble and particulate antigens. Further, both experimental and clinical observations indicate conclusively that living avirulent plague bacilli or killed plague antigens which confer a high protection against bubonic plague likewise immunize the tissues of the respiratory tract and thus give protection against pneumonic plague.

Meyer and his associates at the Hooper Foundation of the University of California have been studying the nature of immunity in plague for some years. The present article is a review of the whole position. In regard to the pathogenesis of plague, it is stated that with the sensitive culture technique the pathways of the plague bacillus can be traced through the tissues of mice, rats, guinea-pigs and monkeys after subcutaneous or intracutaneous administration of avirulent strains. Birds and certain mammals are relatively resistant to plague infection and the mechanism of this natural immunity has interested many workers. It appears, further, that guinea-pigs exhibit a seasonal variation in their resistance to plague. The defence mechanism in acquired, as opposed to natural, immunity has been studied to a limited extent. The fate of plague bacilli in the tissues of immune and susceptible animals has been observed, and it has been recognized that certain antisera specifically alter the "capsule" or "envelope" of virulent plague bacilli. The bactericidal power of blood and serum leucocyte mixtures has been studied. As Meyer observes, there are still many factors not clearly understood in the "vast and somewhat unmanageable array of facts" which he has assembled in his article. Phagocytosis is the most important mechanism which animals and man use in guarding against and disposing of a plague infection. Immunity in this disease is thus cellular rather than humoral. It is highly significant that the immunity afforded by a virulent infection is greater than that conferred by vaccination with different avirulent strains, which in turn is greater than that produced by plague prophylactics consisting of antigens.

HEPARIN AND DICOUMAROL IN CORONARY OCCLUSION.

IN view of the controversy about the use of heparin and dicoumarol in coronary occlusion, it is interesting to read a paper by N. C. Gilbert, G. K. Fenn and L. A. Nalefski[1] in which they allude to these drugs as vasodilators. They state that when coronary occlusion reaches the attention of the physician it has already occurred and an infarct is present; it is not reasonable, they feel, that any anticoagulant drug could effect a change in what is an accomplished fact. There is no evidence that the thrombosis [*sic*] of the coronary vessel increases. They then quote authorities who have recorded subintimal hæmorrhages in 50% to 89% of coronary occlusions, and they argue that drugs to lessen coagulability are contraindicated; such are heparin and dicoumarol. They advocate the use of drugs like aminophylline (seven and a half grains given by injection), replaced as soon as possible by theobromine calcium salicylate or the alkaloid theobromine. In 118 cases in which this treatment was used, the mortality was 12·7% and the thrombo-embolic complications amounted to 5·9%. These results are considered to be as good as those obtained with heparin and dicoumarol. The concluding statement of Gilbert and his colleagues is that they do not question the value of anticoagulant therapy in coronary thrombosis; they do question the mechanism of its action. They also question the propriety of its being used outside a hospital equipped to follow daily the anticoagulant effects; even under such conditions it is not entirely free from danger. In the discussion which followed the reading of this paper the danger associated with the use of dicoumarol was emphasized by Roy W. Scott, who said that there had probably been more fatalities from hæmorrhage than had been reported. This statement will find support and approval amongst those experienced in this field. Others thought that the use of heparin and dicoumarol as vasodilators was unjustified and that there was no evidence that these drugs acted as vasodilators. Warrant for their use in this role appears to be at best disputable.

[1] *The Journal of the American Medical Association*, November 26, 1949.

A CONTRIBUTION TO THE PROBLEM OF PREMATURITY.

INFANT MORTALITY AND MORBIDITY directly associated with prematurity form a problem still causing general concern. A positive contribution directed towards its solution, made recently in Queensland, should therefore be of general interest. A booklet entitled "Problems of Prematurity" has been written, compiled and printed in Queensland, and a copy is being distributed to all medical practitioners who practise midwifery and to nurses in hospitals in the State. The booklet has been prepared under the auspices of the Maternal and Child Welfare Service of Queensland; its main object, pointed out in a foreword by the Honourable Arthur Jones, Minister for Health and Home Affairs, is the reduction of infant mortality due to prematurity, a reduction which has lagged seriously behind that of infant mortality generally. Attractive in general layout and printing, the booklet is small enough to allow reasonable expectation that the busy practitioner will find time and inclination to read it. On the other hand it contains sufficient detailed information to be kept handy as a reference book. The preparation of the material has been left in competent hands. The first article is a brief statistical survey by H. C. Murphy, Director of Maternal and Child Welfare for Queensland; it sets out in clear form local figures for incidence of prematurity, causes of prematurity, infant mortality from prematurity compared with that from other causes, and the factors influencing mortality in prematurity. This sets the reader thinking. Then Geoffrey Shedden Adam, Professor of Obstetrics in the University of Queensland, discusses in a practical way the obstetrical aspects of prematurity and the immediate care of the premature infant. His approach is in three sections: first, a study of the causes of the spontaneous onset of premature labour with a view to their prevention so far as that may be possible; second, a critical analysis of the indications for the therapeutic induction of premature labour; third, a survey of the adequacy and effectiveness or otherwise of all measures taken in the care of premature infants. This is followed by a useful article on the medical supervision of the premature infant by Felix Arden, pædiatric consultant to the Brisbane Women's Hospital. In this the distinctive features of the premature infant are described and discussed, and its management is considered from the points of view, first, of maintenance in good health and second, of symptoms of ill health and their treatment. In the last article, most practical of all, E. McCorkindale, Relieving Acting Matron at the Brisbane Women's Hospital, describes in detail the nursing supervision of the premature infant, including its general care and feeding. An appendix contains photographs of the Ebbs respirator, with instructions for its use, and notes on the transportation of the premature infant and on the essentials required for a premature nursery. The emphasis throughout the booklet is on practical details and preventive measures. Congratulations for a sound piece of preventive medicine are due to the Queensland Director-General of Health and Medical Services, Dr. A. Fryberg, for it was apparently at his suggestion and with his help that the booklet was compiled. The only regrettable aspect is that its distribution is limited to one State.

Abstracts from Medical Literature.

PHYSIOLOGY.

Gastric Distension and the Satiation of Thirst.

E. J. TOWBIN (*The American Journal of Physiology*, December, 1949) reports a series of experiments upon sham drinking in dogs that had undergone œsophagectomy. These revealed that the dog sham drinks some 250% of its real water deficit before temporary satiation occurs. This indicates that when the water drunk does not reach the stomach the animal's ability to measure its intake is seriously impaired. Distension of the stomach reduces the volume of sham drinking and the frequency of sham drinking, so that sham drinking takes on the characteristics of normal drinking. Distension of the stomach may be accomplished by a water-filled stomach balloon with results similar to those in which water was in contact with the mucosa. Mechanical factors account for the major effect of stomach filling so far as inhibition of drinking is concerned. All dogs tested make use of distension cues, but they vary in their dependence upon these cues. The main afferent pathway for impulses initiated by gastric distension and concerned with the regulation of drinking probably ascends the vagi; for, after vagotomy, distension of the stomach has almost no effect upon sham drinking. Satiation of thirst includes an immediate temporary satiation and a subsequent permanent satiation which follows the intestinal absorption of water.

Effect of Variation in Nutritive Density on Intake of Food.

H. D. JANOWITZ AND M. I. GROSSMAN (*The American Journal of Physiology*, August, 1949) report the results of feeding experiments lasting about one year in the case of dogs. The nutritive density of the dog food was reduced by the addition of cellulose roughage to about one-quarter of its original value. Although compensatory adjustments in food intake were made in keeping with the caloric value of the available diet, pronounced individual differences were observed in the rate and precision with which caloric adjustments were made. The tendency to ingest a constant average daily volume of food, "eating for bulk", was modified only slowly and incompletely by the tendency to balance caloric deficits, "eating for calories". A factor of palatability is probably also concerned in these adjustments of food intake.

The Propulsive Motility of the Small Intestine.

J. C. STICKNEY, E. J. VAN LIERE AND D. W. NORTHUP (*The American Journal of Physiology*, August, 1949) report that they have determined the length of the small intestine traversed by a charcoal acacia suspension in five, eight, fifteen and thirty minutes in the case of 126 adult dogs and 111 pups. The rate of propulsion was found to be greater in adult dogs than in pups, but the proportion of the small intestine traversed per interval of time was found to be essentially the same in both. The latter result along with the finding of positive correlations between gut length and rate of propulsion suggest that the speed of propulsive motility may be related to gut length. The physiological significance of such a relation is discussed.

Food Intake.

H. D. JANOWITZ AND M. I .GROSSMAN (*The American Journal of Physiology*, October, 1949) state that the parenteral administration of glucose or protein hydrolysate to the rat and dog in amounts which form significant portions of the daily caloric intake does not produce a corresponding inhibition of food intake during a subsequent meal. When this is contrasted with the adjustment of food intake to bodily need required for the constancy of body weight which the animal ordinarily manifests, it suggests that different factors may be operating in regulating the ingestion of food during any one meal from those involved in regulating food intake over longer periods of time. In intact dogs, the ingestion of a part of a meal twenty minutes before the "ad lib." offering of the same food decreases the oral intake by an approximately equivalent amount. In gastrostomized dogs, the introduction of food into the stomach just before the regular oral meal is offered decreases oral intake by an approximately equivalent amount. Inert material (Karaya gum) is just as effective as food in producing inhibition, indicating that the effect is a mechanical one due to distension. If the intragastric feeding is given several hours before oral feeding, no decrease in oral intake occurs. In œsophagostomized dogs, sham feeding greatly exceeds food deficit. The placing of food into the stomach a few minutes or a few hours before does not inhibit sham feeding. The placing of food into the stomach during sham feeding does some inhibition. Apparently, the factor of gastric distension can operate to reduce food intake only when it occurs simultaneously with oral ingestion. It is concluded that both oral and gastric factors operate and cooperate to regulate food intake during a meal.

The Leucocyte Picture, the Adrenal and the Spleen.

A. DURY (*The American Journal of Physiology*, January, 1950) reports that the effect of the adrenal cortex on certain aspects of the blood leucocyte picture has been shown to involve the participation of the spleen. Absence of the spleen prevents the typical response of the lymphocytes and neutrophile cells to adrenaline injections. This role of the spleen does not involve a change in its ascorbic acid concentration, nor in the ascorbic acid concentration of the adrenal glands. The depression of the eosinophile cells following adrenal cortical stimulation with adrenaline was not affected by the absence of the spleen. The eosinophile cell therefore seemed most unequivocally, of the leucocytes studied, responsive to adrenal cortical activity alone. A pronounced eosinophilia, however, can be induced with adrenaline in adrenalectomized rats, but the cells remain unaffected in amount in adrenalectomized-splenectomized rats. Graphically represented in this paper is the relationship of the absolute number of polymorphonuclear leucocytes per cubic millimetre of blood to the concentration of ascorbic acid in the adrenal glands and spleen of normal intact, adrenaline-injected and saline-injected rats. The relation of the polymorphonuclear leucocytes to the adrenal ascorbic acid is also represented for a group of splenectomized and sham-splenectomized rats. These data show that the polymorpho-leucocytosis induced with adrenaline injections is related to a decreased ascorbic acid content of the adrenals, but this condition induced by splenectomy is not associated with any change in the adrenal ascorbic acid concentration.

Oxygen Transport and Utilization in Dogs at Low Body Temperatures.

W. G. BIGELOW, W. K. LINDSAY, R. C. HARRISON, R. A. GORDON AND W. F. GREENWOOD (*The American Journal of Physiology*, January, 1950) state that when an animal hibernates, the body temperature may fall as low as 4° C. In deep hibernation oxygen consumptions of 3% to 10% of normal have been reported, but when an animal is cooled oxygen consumption up to 300% of normal have been measured, occasioned, no doubt, by the shivering induced. The authors' experiments indicate that there is a steady fall in oxygen consumption of dogs as the body temperature is reduced, ranging from normal down to 18° C. Life could not be maintained at lower levels. The close relationship between temperature and oxygen consumption in different dogs is significant in view of the diversity of size, age and breed. The observations in the literature that indicate an increased consumption of oxygen in non-hibernating mammals as the body temperature is lowered, have been made for the most part in the temperature range down to 25° C., and it is only in this range that shivering may occur if it is not prevented. In their study hypothermia to 18° C. was induced in dogs by exposure to cold air. They were anæsthetized sufficiently to control all shivering and increased muscle tonus. Full arterial blood oxygen saturation was maintained by artificial respiration when necessary. Measurements of oxygen consumption were taken during cooling and rewarming. Oxygen consumption fell consistently with reduction in body temperature down to 18° C. and rose in proportion during rewarming in a way that was parallel. Evidence is presented that under the conditions of these experiments a tissue oxygen deficit did not develop during the period of cooling.

BIOCHEMISTRY.

Hormonal Aspects of Semen Metabolism.

T. MANN AND U. PARSON (*The Biochemical Journal*, April, 1950) report that the formation and composition of seminal plasma are subject to control by several hormones. The withdrawal of the male sex hormone through castration results in disappearance from the seminal plasma of two characteristic components, fructose and citric acid. The formation and secretion of both these substances can be successfully reestablished by subcutaneous implantation or injection of pure testosterone. A direct relationship exists between

the amount of testosterone injected into castrated rats and the response of the accessory organs to produce fructose and citric acid. This makes it possible to use the quantitative assay of fructose and citric acid as a sensitive and simple "hormone indicator test". Hypophysectomy produces effects similar to castration. The secretion of fructose and citric acid by the organs of hypophysectomized animals can be induced by the administration of either gonadotropin or testosterone. In diabetes the content of fructose in semen is considerably increased. In alloxan-diabetic rabbits it was possible to demonstrate the existence of a relationship between hyperglycæmia and fructose level in semen. Insulin administration causes a fall in the level of fructose in the semen of diabetic rabbits. The evidence is discussed which indicates that glucose acts as a precursor of seminal fructose in the animal body.

Phosphorylation.

F. E. HUNTER AND W. S. HIXON (*The Journal of Biological Chemistry*, November, 1949) report that when α-ketoglutarate is oxidized to succinate at 15° C. by washed rat-liver particles supplemented with hexokinase and glucose, directly determined "P:O" ratios (inorganic phosphate removed to atoms of oxygen consumed) of 3·5 to 3·9 can be obtained. When corrections are made for possible side reactions, the "P:O" ratios are still definitely over 3·0 (average 3·4 to 3·5), a fact which suggests that the actual value may be 4·0. Use of incubation temperatures lower than those commonly used seems important for obtaining high "P:O" values consistently.

Synthesis of Lactose.

F. H. MALPRESS AND A. B. MORRISON (*The Biochemical Journal*, March, 1950) report that the synthesis of lactose from glucose and glycogen by tissue slices of guinea-pig mammary gland has been demonstrated chromatographically, and an attempt to evaluate the synthesis quantitatively has been made by a consideration of the results of two entirely unrelated chemical estimations. No lactose synthesis from glucose or glycogen by tissue slices of cow mammary gland could be demonstrated: a critical assessment of previous claims leads to the conclusion that no demonstration *in vitro* of lactose syntheses by ruminant gland has yet been made. Maltose (cow and guinea-pig glands) and lactate (guinea-pig gland) proved ineffective as substrates for lactose synthesis.

Uric Acid Metabolism.

J. D. BENEDICT *et alii* (*The Journal of Biological Chemistry*, November, 1949) have administered isotopic (N^{15}) uric acid in a single intravenous injection to three normal and two gouty subjects maintained on a low purine diet, and followed the isotope concentration of the urinary uric acid for a time thereafter. Analysis of the results obtained from the normal subjects revealed that the injected uric acid was promptly diluted by a miscible pool of uric acid containing about 1200 milligrammes. The rate of formation of uric acid was calculated from the rate of fall of isotope concentration and was found to exceed the rate of urinary excretion of uric acid by about 20% or more. Evidence is presented for the view that a portion of uric acid undergoes catabolic breakdown in man. In the gouty subjects studied the miscible pool of body uric acid was found to be up to 15 times larger than in the normal, so large as to require that a portion of the solid phase urates, joint deposits and tophi be included in this pool.

Sodium and Alloxan Diabetes.

R. R. GRUNERT AND P. H. PHILLIPS (*The Journal of Biological Chemistry*, December, 1949) have investigated the effect of sodium and potassium on the induction of alloxan diabetes in the rat. Sodium deficiency was found to result in an increased incidence of diabetes in the rat. Potassium was not antagonistic to sodium under the conditions used, but desoxycorticosterone did protect the rat against alloxan. The authors state that the influence of the sodium deficiency may be explained by the low level of blood glutathione that was found in these animals.

Phosphorylation in Kidney Homogenates.

A. B. PARDEE AND V. R. POTTER (*The Journal of Biological Chemistry*, December, 1949) have described a homogenate system which oxidizes the substrates of the Krebs cycle, in which the rate and duration are not limited by substrate, buffering, or high energy phosphate. The system maintains high energy phosphate and oxygen uptake for four to six hours with rat kidney, heart, or liver as the enzyme sources, but brain takes up oxygen for only two hours. Tumour is inactive, but stimulates oxidation by kidney. The breakdown of the system was studied, and it was concluded that the mitochondria lose co-factors and otherwise deteriorate. High energy phosphate is required for stability, and its maintenance is aided by citrate, which inhibits the breakdown of adenylic acid that is continually formed from adenosine triphosphate, favouring resynthesis of adenosine triphosphate. A "P:O" ratio of 2·5 ± 0·3 was calculated for the system for the first hour.

Acetic Acid Utilization.

H. N. LITTLE AND K. BLOCH (*The Journal of Biological Chemistry*, March, 1950) have investigated the biological synthesis of cholesterol with the aid of acetic acid-1-C^{14}, acetic acid-2-C^{14}, and with acetic acid labelled by both C^{13} and C^{14}. The utilization of the two carbon atoms of acetic acid as a carbon source for the total molecule and for the cholesterol nucleus and side chain has been determined. Methyl groups of acetic acid have been identified as sources of carbon atoms 18, 19, 26 and 27 and presumably 17 in cholesterol. Carbon atom 25 and probably carbon atom 10 are furnished by carboxyl groups of acetic acid.

Unidentified Pigment in Erythrocytes.

S. S. SPICER *et alii* (*The Journal of Biological Chemistry*, February, 1950) have reported a grossly evident dark colour encountered in washed erythrocytes of rabbits fed a purified diet for a period of from one to two years. Spectroscopic examination of hæmolysates of these cells revealed the presence of an abnormal pigment, the characteristics of which distinguish it from the known derivatives of hæmoglobulin. The red blood cells of slightly less than half the animals receiving the experimental diet, but of none of those receiving the stock diet, gave spectroscopic evidence of the pigment.

Diabetogenic Effect of Ascorbic Acids.

J. W. PATTERSON (*The Journal of Biological Chemistry*, March, 1950) has demonstrated that dehydroascorbic acid produces a characteristic reaction in rats with an LD_{50} of about 320 milligrammes per kilogram. Following a sublethal dose, rats will tolerate a second dose three to four times as large as the initial dose. Dehydroascorbic acid is more effective than ascorbic acid in acting synergistically with alloxan to produce diabetes. Dehydroascorbic acid is shown to be similar to alloxan in structure and chemical properties, and to produce a hyperglycæmia of a few days' duration following a dose of 1·1 grammes per kilogram into rats. Three daily injections of 80 milligrammes are capable of producing what appears to be permanent diabetes in rats weighing about 120 grammes. Dehydroisoascorbic acid produces permanent diabetes in doses of 1·5 grammes per kilogram.

Fixation of Formic Acid in Pyruvate.

H. J. STRECKER *et alii* (*The Journal of Biological Chemistry*, February, 1950) report that enzyme extracts may be prepared from *Escherichia coli* which rapidly fix formate in the carboxyl group of pyruvate, but do not fix either synthetic acetyl phosphate or an acid anhydride formed from pyruvate. It is concluded that acetyl phosphate as such is not a direct intermediate in the fixation of formate in pyruvate. Formate is rapidly fixed by enzyme preparations which produce little or no net breakdown of pyruvate. Furthermore, *Staphylococcus aureus* fixes formate in pyruvate, even though it does not produce an appreciable amount of formate. There is thus no correlation between the extent of the so-called phosphoroclastic reaction and fixation of formate. Possible explanations are considered.

Determination of Albumin.

H. G. KUNKEL AND S. M. WARD (*The Journal of Biological Chemistry*, February, 1950) utilized the reaction of ninhydrin with NH_2 groups as the basis for a photometric determination of protein in antigen-antibody precipitates. Comparison with commoner methods of protein determination indicated that this was more sensitive. The procedure permitted the use of smaller quantities of antiserum for the determination of albumin in biological materials. The correlation between the immunological and the electrophoretic methods of determining albumin was good, regardless of the concentration of albumin and other proteins. Slightly higher values for albumin were obtained by the immunological procedure. The method proved particularly useful for determinations of small quantities of albumin in biological fluids other than serum.

British Medical Association News.

SCIENTIFIC.

A MEETING of the Oto-Rhino-Laryngological Society of New South Wales was held at British Medical Association House, 135 Macquarie Street, Sydney, on May 4, 1950, DR. B. B. BLOMFIELD in the chair.

Poliomyelitis and Tonsillectomy.

DR. J. B. DOWE read a paper entitled "Poliomyelitis and its Relation to Recent Tonsillectomy".

DR. RICHARD E. DUNN read a paper entitled "Poliomyelitis and Tonsillectomy: A Review of the Literature for the Oto-Rhino-Laryngological Society of New South Wales".

These papers were published in the issue of August 12, 1950, at pages 241 and 243 respectively.

PROFESSOR LORIMER DODS said that various noxious influences occurring during the incubation period of poliomyelitis might play a part in the precipitation or even the localization of the paralysis; such noxious influences included undue physical exertion and muscular effort, removal of tonsils and adenoids, injections of whooping-cough vaccine and pregnancy.

DR. E. P. BLASHKI said that he was grateful for the careful and thorough examination and report of the literature brought by the readers of the papers. It would seem that there was no definite conclusion to be arrived at except that, while due care was necessary in times of poliomyelitis epidemic, it still remained for the doctor to judge personally the risks in any one case. There was evidence that patients carrying the virus might suffer through undergoing an operation for tonsillectomy. In the experience of all those present that could not be a very great risk, however, and had to be weighed against that of retaining infected tonsils and adenoids, and the consequences of this, which were well known. It was admitted that those consequences were less to be feared than formerly because of more efficient chemotherapy available. The additional risk involved in the community at least did not appear to be a greatly enhanced one compared to the other daily risks of communal life, and while it needed to be borne in mind, its importance might be subject to exaggeration through statements in the public Press which the man in the street was quite unable to evaluate. Referring to Professor Dods's remarks about the effect of strain in sportsmen and in prospective mothers, Dr. Blashki said that he would emphasize the point that children who were subjected to tonsillectomy must be regarded as having suffered some degree of ill health before their operation, otherwise it was fair to assume that they would not have had the operation. Consequently it was not quite just to take those children and regard them as a number of people forming a section of the ordinary healthy community. It had to be assumed that the tonsils were removed because of a need for the operation and not without cause.

DR. R. H. BETTINGTON stressed the view that there should be some criterion of when the disease reached epidemic proportions and that they should suggest to the public health authorities that a public statement be made when the epidemic started and when it ceased.

DR. D. G. CARRUTHERS expressed his concern that the already embarrassing lists of patients waiting for nose and throat operations should be further disorganized, unless the incidence of poliomyelitis after those operations was definitely shown to be increased. He felt that there should be some standard for the estimation of the intensity of an epidemic, and that it was perhaps misleading to add together the total number of cases throughout a huge State with varying population densities, such as New South Wales. Dr. Carruthers stressed the need for compilation of statistics from their own poliomyelitis cases and from patients undergoing tonsillectomy during the time of an epidemic. He felt that public health authorities should be moved to collect statistics, so that in the future at least the risks might be more exactly known.

DR. H. O. LANCASTER pointed out the arbitrary nature of the definition of an epidemic in any disease that was endemic in a population. He did not think that any numerical measures were likely to be satisfactory and so felt that an epidemic should be "declared" by some competent body, with the necessary corollary that the epidemic would also have to be "declared" to be over at a later date. The evidence for an association between the operation, injection and so on and the paralytic poliomyelitis was in general of an indirect nature, but it was in certain cases quite convincing to his mind. Dr. Lancaster also expressed his thanks to the Section for inviting him to listen to the discussion.

A MEETING of the New South Wales Branch of the British Medical Association was held at the Royal Alexandra Hospital for Children on April 18, 1950. The meeting took the form of a series of clinical demonstrations by members of the honorary medical and surgical staff of the hospital. Parts of this report appeared in the issues of June 24 and August 12, 1950.

Subdural Hæmatoma in Association with Lead Encephalopathy.

DR. T. Y. NELSON presented a girl, aged two years, who had been first admitted to hospital in January, 1948, with a history of constant vomiting since the onset of whooping-cough ten weeks previously. She had lost 14 pounds in weight in three months and over the last month had become very irritable. For three days she had been semi-stuporose and strabismus had developed. In view of the contact with a tuberculous parent, meningitis was suspected, and examination of the cerebro-spinal fluid showed the presence of five mononuclear cells per cubic millimetre, a protein content of 100 milligrammes *per centum*, and a chloride content of 690 milligrammes *per centum*, but there was no fibrin clot, and acid-fast bacilli were not seen in the stained film. Examination of the blood showed the presence of 4,000,000 erythrocytes per cubic millimetre, a hæmoglobin value of 10·5 grammes *per centum*, a reticulocyte count of 2% and punctate basophilia to the extent of 40,000 cells per cubic millimetre. The result of the Mantoux test was positive, but on the evidence a diagnosis of lead poisoning was made; X-ray examination of the long bones showed a slight increase in thickness of the metaphyseal lines of the shafts. Radiological examination of the chest showed evidence of a primary tuberculous complex. As a sequel to this acute episode the child was left with residual paresis of the right side of the face and the right arm, and after four months' treatment in hospital, was discharged. She remained under observation as an out-patient and soon developed twitchings of the right side of the body and seizures in which the head and eyes turned to the right. She continued in that state and, in spite of sedatives, had as many as five or six seizures in the one day. Later examination by electroencephalography showed a tracing which was considered consistent with a lesion in the left parieto-central region. A pneumoencephalogram showed normal-sized ventricles, but the ventricular system was displaced to the left. In March, 1950, craniotomy was performed on the left side, in spite of the findings of the air studies, and a dense membrane was found in the subdural space adherent to the dura on the outer side, and to the arachnoid on the inner. This was removed to the limits of the operative field, and subsequently a further flap was turned to remove the dense membrane from the posterior portions of the hemisphere. Dr. Nelson said that the ventricular shift to the side of the hæmatoma still remained to be explained; it was likely that the subdural hæmorrhage was bilateral and that an even thicker membrane remained on the right side which would be attacked later. It seemed difficult to decide whether the particular part of her complicated illness described was the result of the original whooping-cough or whether it was a complication of lead encephalopathy.

Diaphragmatic Hernia.

Dr. Nelson then showed a male infant, who had been admitted to hospital at the age of four months with a diagnosis of diaphragmatic hernia made by Dr. G. H. Hewitt, of Bellingen. The child had suffered from cyanotic attacks, especially after crying, and had recently vomited after his feedings. X-ray examination at the hospital showed complete dulness of the left side of the chest. The heart was displaced almost completely into the right side of the chest, and there was dulness of the upper part of the right lung field thought to be due to the displaced mediastinum. Barium meal examination was not carried out, as the diagnosis seemed satisfactory without that additional hazard. On the day before operation the baby became very cyanosed with laboured breathing and elevated temperature, but his condition improved with the administration of oxygen and it was decided to proceed with the operation. The operation was carried out by a combined thoraco-abdominal approach, the abdominal incision being eventually extended to divide both recti. The defect in the diaphragm was the common lateral opening without a peritoneal sac, and the thorax was found to contain the whole of the small intestine, much

of the large intestine and the spleen. Those viscera were removed from the thorax, and with the wide access obtained, the diaphragm was readily mobilized and the two segments were brought together with cotton sutures. It was found that the poorly developed abdominal cavity could not accommodate the unusual contents, and Gross's manœuvre was used of leaving a large ventral hernia and covering the abdominal contents with skin and fat only. The baby recovered and was sent home, and the present hospital admission, at the age of sixteen months, was for repair of the ventral hernia. That was a tedious procedure as there were a number of small-bowel loops adherent to the subcutaneous tissues, but a satisfactory closure was obtained. Blood transfusion was necessary to compensate for blood loss, and in the post-operative period considerable distension occurred, necessitating gastric suction and the continuance of intravenous fluid administration.

Cerebral Abscess due to Influenza Bacillus.

DR. T. Y. NELSON and DR. M. SOFER SCHREIBER showed a boy, aged two years, who had had meningitis ten weeks before his admission to hospital, and had been treated with penicillin, sulphadiazine and streptomycin. On admission to hospital he was found to have a huge influenza bacillus abscess in his right cerebral hemisphere. X-ray examination showed the abscess cavity outlined by "Thorotrast". During treatment of the abscess by instillation of streptomycin into abscess and ventricle, the organism became streptomycin-resistant (growing freely in a concentration of 50,000 units of streptomycin per millilitre). However, it was penicillin-sensitive, and the abscess was "cured", but the patient was left in a vegetative state.

Arterio-Venous Aneurysm of Left Cerebral Hemisphere.

Dr. Nelson and Dr. Schreiber then showed a girl, aged thirteen years, who had had sudden loss of consciousness at the age of two years with resultant aphasia and right hemiplegia. Speech returned, but the right arm and leg were left in a state of paresis. At the age of eleven years the patient had had intense pain in the left side of the head and had become unconscious with resultant increase in the right hemiplegia. Plain X-ray examination revealed calcification in the middle of the left cerebral hemisphere and an angiogram revealed an arterio-venous aneurysm.

Meningo-Cerebral Cyst.

The next patient presented by Dr. Nelson and Dr. Schreiber was a girl, aged four years, who had had a compound fracture of the skull at the age of two years. Subsequently a tense cystic swelling developed beneath the scalp and increased in size. A pneumoencephalogram showed a large diverticulum of the anterior horn of the left ventricle, which was displaced to the right. The bone defect was greater than that evident in the X-ray film of two years earlier, and the edges were "flared out" (because of pressure by the meningo-cerebral cyst). At operation the cyst was dissected away from the bone edge and from the surface of the brain, the ependymal wall of the ventricle being exposed. The gap in the dura was covered with a polythene film.

Extramedullary Tumour of Spinal Cord (Meningoma).

The last patient shown by Dr. Nelson and Dr. Shreiber was a girl, aged nine years, whose first symptom, one year prior to her admission to hospital, was pain in the mid-thoracic region; as X-ray examination showed scoliosis, she was treated on a frame in an orthopædic department. Later she gradually developed paraplegia in extension and paralysis of her back and abdominal muscles. Posterior column sensibility was impaired, but there was no sphincter involvement. Vibration sense was present down to the seventh rib and spinous process. Lumbar puncture produced cerebro-spinal fluid containing two cells per cubic millimetre and 800 milligrammes of protein *per centum*. A myelogram showed a block at the level of the third thoracic vertebral body. At operation a meningioma was removed.

Duodenal Atresia (Intrinsic Duodenal Block).

DR. J. STEIGRAD showed a male infant, who had been admitted to hospital on February 16, 1950, at the age of eight days. The child's weight at birth had been seven pounds three ounces. On the first day after birth he vomited a large amount of mucus on two occasions and passed meconium once; he was put to the breast. On the second day he vomited a large amount of slightly green fluid on one occasion and passed meconium; he was breast fed. On the third day a weight loss was recorded of nineteen and a half ounces since birth. He vomited once after feeding and passed a very small greenish stool. He was lethargic and was tube-fed with breast milk. On the fourth day, three-quarters of an hour after tube feeding, he vomited a large quantity of fluid with curds. A black stool was passed. Vomiting became more persistent after each feeding. The administration of streptomycin (40,000 units before each feeding) was commenced, as gastro-enteritis was suspected. On the fifth day intravenous therapy was started, with procaine penicillin, a quarter of a millilitre daily, and phthalylsulphathiazole, 0·06 gramme every four hours. One dark green "stool" was passed. On the sixth day distension of the abdomen was observed. Half an ounce of expressed breast milk was given, followed by three-quarters of an ounce every three hours. The child developed twitching of both sides of the body with cyanotic attacks lasting for two to three minutes. These were relieved by oxygen. On the seventh day he passed one large, dark green, mucous stool and vomited two ounces of fluid after the insertion of a stomach tube. On the eighth day X-ray examination of the abdomen showed a large stomach and distended first part of the duodenum. No air was seen in the remainder of the bowel. The child was admitted to hospital with a diagnosis of duodenal obstruction. He was then vomiting much bile-stained fluid. Gastrojejunostomy was performed on the same day. At operation duodenal atresia was found with the superior mesenteric artery lying above the first part of the duodenum. There appeared to be a complete block of the third part of the duodenum, the first and second parts and the proximal portion of the third part being extremely dilated; the portion of the duodenum distal to the block was apparently not patent. The mesenteric attachment was lying free to the right side. Intravenous therapy was given for eleven days. Progress was satisfactory. X-ray examination on March 1 showed gas in the stomach, in the small intestine and in portions of the large intestine (probably the transverse and descending colon). No dilatation and no fluid levels were seen. Further X-ray examination on March 27 showed that the anastomosis was not functioning very well. There was still a large twenty-four-hour residue in the stomach and the first and second parts of the duodenum were dilated.

Volvulus Neonatorum and Extrinsic Obstruction of the Duodenum.

Dr. Steigrad then showed a male infant who had been admitted to hospital on March 30, 1950, at the age of thirteen days. The child's birth weight had been seven pounds fifteen ounces. He had cried and sucked satisfactorily three days after birth and had gained weight until the age of nine days, when he commenced vomiting soon after feeding. The vomiting was projectile in character and the vomitus bile-stained. When admitted to hospital he vomited after all feeds. Peristaltic waves were visible commencing beneath the left costal margin and travelling well past the mid-line. X-ray examination showed that the stomach was grossly dilated, with a fluid level when the patient was in the erect position. Some gas was visible in the intestine, which, however, showed no evidence of dilatation. The appearance suggested stenosis in the neighbourhood of the duodenum. At operation on March 30 he was found to have *volvulus neonatorum* with one and three-quarter turns in a clockwise direction, no fixation of the small intestine, and the caecum and appendix overlying the third part of the duodenum and producing constriction and obstruction. The volvulus was untwisted and the broad band holding the caecum to the duodenum incised. The small bowel was returned to the right and the caecum and appendix to the left side of the abdomen. After operation he was given saline rectally and glucose and water orally. Expressed breast milk was being given by April 1 and breast feeding was commenced on the following day. Intravenous therapy was given from April 3 to 5. His weight on April 7 was seven pounds three and three-quarter ounces and on April 12 was seven pounds thirteen and a half ounces. X-ray examination on April 3 showed that the stomach was large and contained a large gas bubble. Gas was seen beyond it. Dr. Steigrad said that the child's progress had been satisfactory; he was to leave hospital after the meeting.

Ischæmic Paralysis following Acute Hæmatogenous Osteomyelitis.

Dr. Steigrad's next patient was a boy, aged seven and a half years, who had been admitted to hospital on January 16, 1950, with the history that on January 11 he had fallen and struck his left arm. On the day after the injury the arm was painful and slightly swollen, and on January 14 it became much more swollen and tender, a swelling also developing in the centre of the back, and the child became feverish. On admission to hospital he had a swelling of the left forearm extending from the hand to above the left

elbow. It was very tender, with maximal tenderness over the upper end of the ulna. A swollen tender area was present over the twelfth thoracic vertebra. He was treated with penicillin (aqueous penicillin 100,000 units three-hourly and procaine penicillin 300,000 units daily), and on January 20 a subperiosteal abscess surrounding the whole of the left ulna and a metastatic abscess over the twelfth thoracic vertebra were evacuated. A splint was applied to the left arm with the elbow at right angles. The boy then developed contracture of the fingers with interference with sensation in the ulnar distribution and pronounced wasting of the ulnar intrinsic muscles. He was given physiotherapy and some improvement occurred. It was concluded that he had Volkmann's type of ischæmic contracture involving the ulnar and, in part, the median nerve, producing *main en griffe*, and that this was due to intense œdema from the osteomyelitis about the elbow joint.

Traumatic Hemiplegia following a Local Injury.

Dr. Steigrad also showed two children who had developed hemiplegia after sustaining an injury in the region of the palate. These will be the subject of a full report at a later date.

Tuberculous Osteomyelitis of the Humerus.

DR. E. H. GOULSTON showed a boy, aged two and a half years, who had been admitted to hospital on February 16, 1950, with the history of a "lump" in the upper part of the left arm since October, 1949. X-ray examination at that time had shown no abnormality. The swelling had increased in size in January and February, 1950, but caused no pain. The boy's mother had pulmonary tuberculosis. The "lump" was found to be a soft fluctuant swelling of the upper third of the left humerus. X-ray examination revealed a large, irregularly loculated area in the upper end of the diaphysis of the left humerus with considerable swelling of the adjacent soft tissue; the appearance suggested that the condition was fibrocystic disease, eosinophilic granuloma or hydatid disease, the most likely of the three being hydatid disease. The radiological appearance of the lung fields was normal, and no other lesion was seen in the skull, legs, pelvis or arms. The Mantoux reaction was positive with a dilution of 1 in 1000. Blood examination revealed a total erythrocyte count of 4,600,000 per cubic millimetre, a hæmoglobin value of 11·5 grammes *per centum*, and a leucocyte count of 5600 per cubic millimetre, 40% being neutrophile cells, 56% lymphocytes and 4% monocytes. The urine was normal. The result of a hydatid complement-fixation test was negative. The blood sedimentation rate was five minutes in one hour. Pus was aspirated from the swelling on two occasions; no tubercle bacilli were seen on direct examination, but light growths of *Mycobacterium tuberculosis* were obtained on culture, and an inoculated guinea-pig was found *post mortem* to have typical lesions of tuberculosis. A shoulder spica was applied. X-ray examination of the humerus on March 8 and on April 12 showed no obvious change. Intramuscular streptomycin therapy was started on March 25, and up to the time of the meeting ten and a half grammes had been given. The swelling had diminished in size. Curettage of the lesion was contemplated.

Wilms's Tumour.

Dr. Goulston's second patient was a boy, aged five years, who had been admitted to hospital on September 20, 1948, in good general health. He had a firm smooth tumour in the left hypochondrium, which moved on respiration. An excretion pyelogram showed that the left kidney shadow was much enlarged with spreading of the calyces and evidence of pressure on the pelvis. The condition was regarded as a diffuse renal tumour, presumably a Wilms's tumour. At laparotomy on September 21 a tumour of the left kidney was found and left nephrectomy was performed. Histological examination confirmed the diagnosis of Wilms's tumour. On October 1 the honorary radiotherapist ordered a course of deep X-ray therapy. At the time of the meeting the patient was in good health and showed no evidence of metastases.

Congenital Intestinal Atresia.

DR. E. S. STUCKEY presented a female infant, who had been admitted to hospital on December 17, 1949, at the age of four days, suffering from intestinal obstruction. She vomited twice on the first day, immediately after feedings; X-ray examination showed no air in the large bowel and several very distended loops of small bowel. Operation revealed complete atresia of the middle part of the ileum, which was represented by a cord of a few inches in length, and then a complete gap in the mesentery. The collapsed lower part of the ileum was examined. A two-layer side-to-side anastomosis was performed. After that was completed, peristaltic waves were seen to pass from the upper to the lower segment across the anastomosis. Post-operative treatment included gastric suction, intravenous therapy and penicillin. Vomiting continued on and off for five days after the operation. On February 7, 1950, when the child was apparently fit for discharge from hospital, she vomited and her abdomen became distended, and plain X-ray examination showed dilated loops of bowel and fluid levels. A second operation revealed multiple adhesions. One loop of bowel was crossed by a band about six inches below the anastomosis, the small bowel above the band being dilated. The obstruction was freed, and the child progressed steadily until her discharge from hospital on March 18, 1950. Two weeks later she was readmitted to hospital with frequent green motions and a temperature of 101·4° F. The provisional diagnosis was gastro-enteritis, but no organisms were grown from the stools and the diagnosis may not have been correct. The condition settled down after four days of intravenous therapy and streptomycin and sulphadiazine given by mouth. The child was well at the time of the meeting.

Repair of Vaginal Anus.

Dr. Stuckey then presented a girl, aged seven years, who had been known for some time to have a vaginal anus and had been examined under anæsthesia previously, but operation was not advised. She was admitted to hospital on November 21, 1949, and was found to have a vaginal anus opening in the posterior commissure of the vulva, with a tiny dimple at the normal anal site. She was partly incontinent of fæces and soiled herself several times daily. The fæces were usually soft, but occasional constipation was relieved by administration of olive oil. No obstructive episodes had occurred. All other systems were normal. Operation was proposed on the urgent insistence of the parents, although it was stressed that it would not cure her of incontinence. Previous X-ray examination had shown that the rectum ended blindly about two inches above the anal dimple, with a narrow but distensible recto-vaginal fistula. Operation was performed on November 29 with penicillin cover. A transverse incision was made just behind the vulva, with a circular incision around the fistulous opening. The tissue planes were separated to expose the blind rectal pouch and to mobilize it and the fistula from the vaginal wall. A stab wound was made through the anal dimple, and the fistula was transplanted to the anal orifice and sutured to the skin edges. The levator muscles were brought together in front of the new anus and the incision was closed with interrupted cotton sutures. On December 6 the sutures were removed under anæsthesia. Part of the wound had broken down at the vaginal end, and it was resutured there. On December 13 the new anus was dilated gently and the sutures were removed. On December 20 the anus was dilated. There was a tiny opening still from the rectum to the vaginal fourchette. Dilatation of the anus was repeated at intervals and the fistula was carbolized. By March 21, 1950, all fæces were passing through the new anus, and the parents were well pleased, although the child still soiled herself several times a day. It was felt that the child was at least as well off in regard to continence as she had been before operation. Cosmetically and psychologically she was in a position to feel much more normal than before. Full continence was not to be expected owing to the deficient sphincter mechanism.

Oblique Fracture of the Tibia.

DR. L. MACDONALD showed a girl, aged eight years, who had been admitted to hospital on April 9, 1950. A note from her doctor in the country stated that on March 19, 1950, she had been knocked down by a motor car and had sustained fractures of both bones of the left forearm and of the left leg. The forearm fractures had been successfully reduced and immobilized, but repeated attempts at reduction of the tibial fracture had been unsuccessful in the gaining of satisfactory alignment. X-ray examination on her admission to the Royal Alexandra Hospital for Children showed oblique fractures about the middle of the shafts of the left tibia and fibula, with considerable overlap and outward angulation of the lower fragments. Considerable callus was present. Open reduction was carried out and a stable end-to-end position achieved. Dr. Macdonald commented that the case demonstrated the difficulty that might arise in the closed reduction of an oblique fracture of the tibia. Perforation of the periosteum might make manipulative reduction impossible, and open operation was justifiable, even in children, in certain cases. After accurate reduction a stable position could usually be obtained; the use of screws and plates would seldom be necessary.

Tuberculosis of the Wrist Joint.

Dr. Macdonald's second patient was a boy, a "New Australian" aged two years, who had been admitted to the orthopædic section of the Children's Hospital, Melbourne, on December 22, 1949, with a history of a swelling on the dorsum of the left wrist for three months. He also showed a marked degree of *talipes equino varus*. The Mantoux reaction was strongly positive, and acid-fast bacilli were found in pus aspirated from the swelling. The child's feet had been manipulated with satisfactory position and the wrist had been immobilized in plaster. Dr. Macdonald said that tuberculosis of the "wrist" joint was not common in Australia. In that situation the disease was resistant to treatment and sinus formation was common. Prolonged immobilization was necessary with the hand dorsiflexed, and constant care must be exercised to prevent contractures of the fingers. Skeleton splints of metal were preferable to complete plaster fixation, as the latter method tended to promote further decalcification.

Supracondylar Fracture with Early Ischæmic Contracture.

DR. R. L. STEPHEN showed a girl, aged four years, who had fallen off a fence on April 13, 1950, and sustained a left supracondylar fracture. Reduction was attempted in the country on the same day. Further X-ray examination the following morning showed that reduction was unsatisfactory. The child was admitted to the Royal Alexandra Hospital for Children on April 16 with the left forearm tightly bound to the arm in a position of acute flexion. No radial pulse could be felt. The child was very uncooperative, but appeared to have complete loss of power and sensation in the hand and forearm. Also there appeared to be early ischæmic contracture as extension of the wrist produced flexion of the fingers.

Case of Orthopædic Interest.

Dr. Stephen's second patient was a girl, aged nine years. Her early past history was difficult to obtain, but apparently she had had flexion deformity of the right knee since she was about two years old, and it was stated that fluid had been aspirated from the knee region at about that time. She was admitted to hospital on March 29, 1950, for correction of a flexion deformity of the right knee, and on examination was found to have flexion deformity of the right elbow also; the whole right lower limb was very wasted. X-ray examination showed an old tuberculous process in the right knee and a recent united fracture above the femoral condyles. Treatment being employed consisted of traction on a jointed Thomas splint.

Supracondylar Fracture.

Dr. Stephen's last patient, a boy, aged six years, had been admitted to hospital from the casualty department on March 9, 1950, with a supracondylar fracture of the left humerus. There was gross swelling around the elbow and the radial pulse was impalpable. No nerve damage was detected. Attempts at reduction failed to achieve a satisfactory position with pulsation in the radial artery. About five hours after the time of the injury the brachial artery was exposed in the cubital fossa and it exhibited intense spasm. The artery was traced for five inches into its radial branch before normal artery was reached. Periarterial sympathectomy and then injection of local anæsthetic along the course of the vessel were performed. Gradually the spasm began to relax, but a length of one and a quarter inches near the upper end of the radial artery remained in spasm and was eventually excised. Two further manipulations were carried out on March 13 and 16 before good position was achieved, but no further arterial spasm occurred; at the time of the meeting he had a strong radial pulse. Finger and wrist movements had been carried on throughout. There was considerable thickening in the muscles just above and below the elbow, especially in the brachialis muscle.

Obituary.

REGINALD JOHN VERCO.

WE are indebted to Dr. E. A. H. Russell for the following appreciation of the late Dr. Reginald John Verco.

With the passing of Reginald John Verco the medical profession has lost an exceedingly wise counsellor, and those of us who were privileged to know him intimately, a staunch, upright and loyal friend who was thoroughly intolerant of anything that was subversive and who would place principle above all other considerations.

John was the son of John Verco, who was, throughout his life, very closely associated with his brilliant brother, Joseph Cooke (later Sir Joseph) Verco, who was awarded the gold medal for gaining first place in his final M.D. (London) examination. If anything, John Verco, senior, was even more brilliant than his brother, Sir Joseph, but unfortunately an illness during his student days terminated what promised to be an outstandingly successful medical career. R. J. Verco grew up in an atmosphere that demanded those high qualities of rectitude and soundness of ethical practice engendered in him through the influence of his forebears.

Some of us, who as small boys were his friends at Prince Alfred College some fifty years ago, knew John as a somewhat impish but always a most unselfish and delightful companion, possessing a keen sense of humour and spontaneous dry wit with, sometimes, a touch of sarcasm that

would never offend. He would work and play strenuously, but at different times; it was this happy quality of logical concentration throughout his life that, I believe, contributed so greatly towards his undoubted success.

In 1905, at the University of Adelaide, he was placed at the head of the first class of his year and accordingly was the Davies Thomas Scholar of that year. Again, in 1907, in his final year, John topped the first class, and by so doing was the Everard Scholar—a coveted distinction. During his student days he was a very useful athlete. He was a hurdler at school, and at the university he played intervarsity lacrosse in 1906; 1907 and 1908, and gained his blue; he was an ideal third home, possessing weight, pace and the courage to win through, and he was a member of the university team that won the South Australian premiership in 1908. After his house surgeoncy at the Adelaide Hospital he spent a short while in the country before returning to Adelaide where he practised until the end. John was a foundation member of the Royal Australasian College of Surgeons, and it was a source of delight to his colleagues when it was known that his son, Geoffrey, had also been admitted to the College as a Fellow, but sadly enough only a week or two before his father's death. However, John Verco's outstanding contribution to humanity was in the role of a general medical practitioner—the family doctor of old—on whom so many of his large clientele could lean and obtain solace from advice so ungrudgingly proffered.

John had many sessions on the Council of the South Australian Branch of the British Medical Association and was thrice President (1940-1943). On the death of Alfred Stokes in 1943, John Verco was elected to the Federal Council, and no better choice could have been made. In debate he possessed the faculty of appreciating the other person's point of view, which occasionally, on the surface, may have appeared to be a slightly weak trait, but indeed it was strength. At all times he had the courage of his own convictions and knew exactly when he knew his subject; a very much rarer quality, he knew when he did not know his subject—hence at times his reticence. His capacity for work was amazing, and this was all the more remarkable on account of a disability of which he was fully cognizant. This service must have been a contributing factor in hastening his death, but from my knowledge of John's delightful philosophy, he would have considered death merely as an isthmus between this life and a better.

In 1909 he married Phoebe Frances, eldest daughter of the late Charles R. Hawkes. Our sincere sympathy is extended to his widow, his daughter and his two sons, the elder of whom, Dr. Geoffrey Verco, was his partner.

Dr. F. L. Wall writes: Reginald John Verco's career has maintained the traditions of an Adelaide name already famous in medicine. Whereas his uncle, the late Sir Joseph Verco, was our doyen of physicians, John achieved the same eminent position amongst general practitioners. He was a foundation member of the Royal Australasian College of Surgeons, but his special gifts found particular expression in his forty years of general practice and in his work for the British Medical Association. It was the abundance of a generous heart which made him choose the sphere of greatest scope for personal good works for his fellow men. He loved his patients and his work amongst them, and he forgot himself, refusing to heed the physical limitations which for the last ten years crowded in upon him. Self-sacrificing service to all was his motto. What personality was required to infuse into a high-pitched monotone enunciation a holding sense of interest! Originality of expression, thoughtful preparation and an ever-present twinkling humour were his special talents. What courage enabled a sick and overworked general practitioner to preside for three consecutive hectic war years in the Branch Council of the British Medical Association and to outbid his fellows in helping in war-vacancy work! We might think that sense of duty and intensive application of it would have obscured the inevitable consequences, but to him the end was plainly seen. In latter times, when his own prognosis seemed so problematical, he would pun, "Here comes the late Dr. Verco", when unable to keep an appointment punctually. On the same day that he died he rang a hospital to confirm an operation time two weeks ahead. He would be there, "the white ants permitting". We are all inspired by Dr. Verco's work for his patients, the British Medical Association and the maintenance of standards in general practice. Such service, so bravely given, for him was "perfect freedom".

Dr. Henry Halloran writes: Having had the privilege of knowing Reginald John Verco as friend and colleague in the Eastern District for thirty-five years, I venture to add my tribute to this universally loved and respected physician. John's tireless devotion to duty, deep wisdom, skill and whimsical kindly humour combined to make him the embodiment of all that is best in our conception of the family doctor. His passing leaves us all with a deep sense of imperishable memory.

Dr. Charles Duguid writes: The death of Dr. Reginald John Verco removes from South Australia one of its best known, best loved and ablest practitioners. In the past thirty-six years it was my privilege to work with him closely and to exchange views with him on the many sides of life. Courage and cheerfulness were his outstanding virtues. For many years he had known his health was impaired, but the smile never left him, and when another and more serious disability made itself felt, and he had to take to bed, the quizzical merriment was still in evidence. The fun in him was a legacy from his father. No man, surely, has ever spent himself more fully in the interests of his patients. He started out early, worked late, and very often had little time in bed. There were those of us who felt he was driving the body too hard, but he would always answer that he was happiest when busiest. He graduated in Adelaide in 1907 and was top of his year. He gave much time to the British Medical Association, and he was a member of the Council of the Australasian Trained Nurses Association. The medical and nursing professions and his patients alike will miss him sorely. John Verco was fond of reading and in recent years found some respite in the breeding of dairy stock. But apart from his practice his chief joy was his home. His wife was his constant stay and support in all his manifold duties during the forty-one years of their married life. *Sic itur ad astra.*

HUBERT SYDNEY JACOBS.

WE regret to announce the death of Dr. Hubert Sydney Jacobs, which occurred on July 31, 1950, at Malvern, Victoria.

Royal Australasian College of Surgeons.

FINAL FELLOWSHIP EXAMINATION.

THE next meeting of the Court of Examiners for the final examination for Fellowship of the Royal Australasian College of Surgeons will be held at the College in Melbourne beginning on Thursday, May 3, 1951.

Candidates who desire to present themselves at this examination should apply, on the prescribed form, to the Censor-in-Chief for permission to do so on or before April 1, 1951. The appropriate forms are available from the Secretary, Royal Australasian College of Surgeons, Spring Street, Melbourne, C.1.

Candidates who have been approved by the Censor-in-Chief, but who have not yet presented for examination, may present at this examination, provided they notify the Secretary of their intention to do so by April 1, 1951.

The examination fee is £21 *plus* exchange on cheques drawn on banks outside Melbourne, and must be paid to the Secretary by April 1, 1951.

Course for the Final Fellowship Examination.

Subject to the receipt of a satisfactory entry, the Royal Australasian College of Surgeons will conduct, in Melbourne, a course of lecture demonstrations for the final fellowship examination.

The course will begin early in March, 1951, and will conclude at the end of April, 1951. A detailed syllabus is available on application.

The fee for the course is £10 10s. *plus* exchange on cheques drawn on banks outside Melbourne and should be forwarded with entries.

Medical Practice.

POLICE OFFENCES (AMENDMENT) ACT, 1908, AS AMENDED.

ADVICE has been received from the Under Secretary, Chief Secretary's Department, Sydney, that the drug regulations under the *Police Offences (Amendment) Act* have been amended to provide that prescriptions for drugs to which the Act has been applied shall clearly indicate the intervals at which prescriptions are to be repeated; chemists are required under the amended law not to dispense a drug prescription at more frequent intervals than indicated thereon.

The amendments are published in the *New South Wales Government Gazette* of August 11, 1950.

The amended regulations are now as follows:

Regulation 17(2)(*a*): The prescription shall be written in ink, shall be dated, shall bear the name and address of the person for whom the prescription is given, shall be signed by the medical practitioner or registered veterinary surgeon by whom it is given, shall show the address of such medical practitioner or veterinary surgeon, and shall clearly indicate the maximum number of times and the intervals at which such prescription shall be dispensed.

Regulation 19(3)(*a*): The following conditions shall be observed by persons dispensing any such prescription for or supplying a drug upon any such prescription:

(*a*) The prescription shall not be dispensed more than the maximum number of times or at more frequent intervals than indicated thereon, and on each occasion upon which it is dispensed shall be stamped or marked in writing or otherwise to show clearly the date upon which it is dispensed and the name and address of the person by whom it is dispensed. . . .

Medical Societies.

THE INTERNATIONAL FEDERATION OF PHYSICAL MEDICINE.

AT a meeting held at the Royal Society of Medicine, London, on May 10, 1950, it was formally resolved to constitute a body to be known as the International Federation of Physical Medicine. The main object of this body will be to promote international congresses on physical medicine at regular intervals. The Australian representative is Dr. B. G. Wade, of Sydney.

Correspondence.

MEDICAL LIBRARIES AND INCOME TAX.

SIR: I maintain a small medical library, to which I very frequently refer in the course of my work, in order that my professional knowledge should not become rusty. I keep a catalogue of the library, showing the values of the books, and each year in my income tax return I claim and am allowed a deduction from my income equal to 5% of the value of the books to cover depreciation. (In fact they depreciate at a greater rate than 5% *per annum*.) When I buy new books I cannot, of course, claim any deduction in respect of their cost, for I am increasing the capital value of my library. But sometimes I have to replace a book which has become obsolete by a newer edition of the same work. Hitherto I have not claimed a deduction in respect of this replacement, but I feel that I should be allowed to do so, even though the cost of the new edition is greater than that of the obsolete one.

I think it would be helpful both to me and to others if our association would obtain and publish a ruling in this matter from the Taxation Department. I should also like to know whether the special initial depreciation of 20% in the first year in respect of new equipment applies to books.

Yours, etc.,

185 Macquarie Street, Sydney, August 5, 1950.

TAX HAPPY.

Post-Graduate Work.

THE UNIVERSITY OF QUEENSLAND POST-GRADUATE MEDICAL EDUCATION COMMITTEE.

Advanced Course in Medicine.

THE University of Queensland Post-Graduate Medical Education Committee announces the following details of an advanced course in medicine.

The course will be of twelve weeks' duration; two sessions will be held per week to consist of a formal lecture followed by a demonstration of clinical cases pertinent to the subject of the lecture. The sessions will be held at the Brisbane Hospital lecture theatre at 8 p.m. The syllabus is as follows:

August 22 and 24: Professor W. V. Macfarlane, "Application of Physiological Principles to Medical Practice: (*a*) General, (*b*) Particular Symptoms".
August 29: Dr. E. W. Abrahams, "Pulmonary Tuberculosis".
August 31: Dr. Athol Robertson, "Non-Tuberculous Pulmonary Disease".
September 5: Dr. Morgan Windsor, "Surgical Treatment of Pulmonary Disease".
September 7: Dr. Alan E. Lee, "Symptomatology of Abdominal Disease".

DISEASES NOTIFIED IN EACH STATE AND TERRITORY OF AUSTRALIA FOR THE WEEK ENDED JULY 29, 1950.[1]

Disease.	New South Wales.	Victoria.	Queensland.	South Australia.	Western Australia.	Tasmania.	Northern Territory.[2]	Australian Capital Territory.	Australia.[3]
Ankylostomiasis	*	..	6	..	..	..	..	..	6
Anthrax	*	..	..	..	..	..	..	..	..
Beriberi	*	*	*	*	*	*	..	*	..
Bilharziasis	*	..	..	..	..	..	..	..	..
Cerebro-spinal Meningitis	1	..	..	1(1)	1	..	..	..	3
Cholera	..	..	..	..	..	..	..	..	..
Coastal Fever(*a*)	*	*	..	*	*	*	*	*	..
Dengue	*	*	*	*	*	*	..	*	..
Diarrhœa (Infantile)	..	..	1	..	..	..	..	..	1
Diphtheria	7(5)	2(1)	5(4)	1(1)	6(4)	..	..	..	21
Dysentery (Amœbic)	*	2(1)	..	..	..	..	..	..	2
Dysentery (Bacillary)	*	4(4)	5(5)	..	..	..	..	..	9
Encephalitis Lethargica	..	..	..	..	..	..	..	..	..
Erysipelas	*	*	*	..	*	*	..	..	..
Filariasis	*	..	..	..	..	..	..	..	..
Helminthiasis	*	..	*	*	*	*	*	*	..
Hydatid	*	2	*	*	..	*	*	..	2
Influenza	*	*	*	1	*	*	..	*	1
Lead Poisoning	*	*	..	*	*	*	*	*	..
Leprosy	..	..	..	..	..	..	..	..	..
Malaria(*b*)	*	..	1(1)	..	..	..	..	..	1
Measles	*	*	*	186(93)	*	*	..	..	186
Plague	..	..	..	..	..	..	..	..	..
Poliomyelitis	9(4)	1(1)	2	9(7)	2(1)	..	..	1	24
Psittacosis	*	..	*	..	*	*	*	*	..
Puerperal Fever	..	..	1	2(1)	..	..	..	..	3
Rubella(*c*)	*	*	..	*	2(2)	*	..	..	2
Scarlet Fever	13(7)	15(13)	6(3)	15(12)	9(8)	4(3)	..	..	62
Smallpox	..	..	..	..	..	..	..	..	..
Tetanus	*	..	..	*	*	*	*	*	..
Trachoma	*	..	*	*	*	*	*	*	..
Tuberculosis(*d*)	56(39)	17(11)	8(4)	7(5)	25(16)	2(1)	..	..	115
Typhoid Fever(*e*)	..	..	..	..	..	..	..	..	..
Typhus (Endemic)(*f*)	..	..	5(1)	..	1(1)	..	..	..	6
Undulant Fever	..	1	..	..	..	..	..	..	1
Weil's Disease(*g*)	*	*	..	*	*	*	*	*	..
Whooping Cough	*	*	*	3(3)	*	*	..	..	3
Yellow Fever	..	..	..	..	..	..	..	..	..

[1] The form of this table is taken from the *Official Year Book of the Commonwealth of Australia*, Number 37, 1946–1947. Figures in parentheses are those for the metropolitan area.
[2] Figures not available.
[3] Figures incomplete owing to absence of returns from the Northern Territory.
* Not notifiable.
(*a*) Includes Mossman and Sarina fevers. (*b*) Mainly relapses among servicemen infected overseas. (*c*) Notifiable disease in Queensland in females aged over fourteen years. (*d*) Includes all forms. (*e*) Includes enteric fever, paratyphoid fevers and other Salmonella infections. (*f*) Includes scrub, murine and tick typhus. (*g*) Includes leptospiroses, Weil's and para-Weil's disease.

September 12: Dr. Alan E. Lee, "Peptic Ulcer".
September 14: Dr. D. H. Brandis, "Ulcerative Colitis".
September 19: Dr. L. D. Walters, "Diseases of the Liver and Pancreas".
September 21: Dr. Garth McQueen, "Diabetics".
September 26: Dr. James Hart, "Unequal Pupils".
September 28: Dr. N. W. Martin, "Retinal Changes in Systemic Disease".
October 3: Dr. P. A. Earnshaw, "Pædiatrics".
October 5: Dr. David Jackson, "Pædiatrics".
October 10: Dr. Paul Schaffer, "The Arthritides".
October 12: Dr. N. Goldman, "Cerebral and Spinal Cord Localization".
October 17: Dr. C. Leggett, "Thyreotoxicosis".
October 19: Dr. C. Leggett, "Malignant Hypertension".
October 24: Professor G. Shedden Adam and Dr. R. A. Thatcher, "Female Endocrinology".
October 26: Dr. J. Inglis or Dr. D. G. Neill, hæmatology demonstration.
October 31: Dr. Richard Row, radiology demonstration.
November 2: Dr. V. E. Sampson, "Nephropathy".

The fee for the course will be £7 7s., payable in advance, cheques to be made payable to the University of Queensland, and sent with the application form to the Secretary, Post-Graduate Medical Education Committee, 225 Wickham Terrace, Brisbane.

Bibliography of Scientific and Industrial Reports.

THE following bibliographies have been prepared by the Commonwealth Scientific and Industrial Research Organization Tracer Elements Investigations. Distribution of a limited number has been undertaken by the Commonwealth Scientific and Industrial Research Organization Information Service and copies may be obtained on application to the Officer-in-Charge, C.S.I.R.O. Information Service, 314 Albert Street, East Melbourne, C.2. The bibliographies are, in the majority of cases, selective only. Applicants should state clearly the reason the bibliography *et cetera* is requested, because the number of copies available is limited.

B.416: "Dosage Calculation with Radio-Iodine", Technical Communication Number 36, January, 1950.
B.417: "Use of Radio-Isotopes for Blood Disorders", Tracer Elements Bibliography 2B, February, 1950 (30 references).
B.418: "Application of Radio-Isotopes to the Thyreoid Gland", Tracer Elements Bibliography 3B, February, 1950 (133 references).
B.419: "Use of Radioelements for Study of Blood, Circulation and Respiration", Tracer Elements Bibliography 7B, February, 1950 (70 references).
B.420: "Study of Bone with Radioelements", Tracer Elements Bibliography 14A, February, 1950 (12 references).

Nominations and Elections.

THE undermentioned have applied for election as members of the South Australian Branch of the British Medical Association:

McLeay, Donald Barton, M.B., B.S., 1948 (Univ. Adelaide), 2 Oaklands Avenue, Royston Park.
Milazzo, Stephen Charles, M.B., B.S., 1949 (Univ. Adelaide), Royal Adelaide Hospital, Adelaide.

The undermentioned have been elected as members of the South Australian Branch of the British Medical Association:

Simons, Sophie Lucie Chlotilde, M.D., 1927 (Baun.), 384 Main North Road, Enfield.
Slade, John Harman, M.B., B.S., 1946 (Univ. Adelaide), c.o. Bank of New South Wales, Berkeley Square, London.

Medical Appointments.

Dr. Brian Richard Walsh has been appointed a resident medical officer at the Royal Adelaide Hospital.

Dr. James Arthur Bonnin has been appointed Deputy Director of the Institute of Medical and Veterinary Science, Adelaide.

Dr. Donald Charles Cameron Sword has been appointed Government Medical Officer at Cairns, Queensland.

Dr. David Owen Crompton has been appointed honorary visiting ophthalmologist to the Northfield Wards of the Royal Adelaide Hospital.

Dr. Richard Alfred Amyas Pellew has been appointed honorary visiting medical officer to the Northfield Wards of the Royal Adelaide Hospital.

Dr. Shirley Hilda Calder has been appointed an associate medical officer of the Royal Adelaide Hospital.

Dr. Alan Bruce Lilley, Chairman of the Hospitals Commission of New South Wales, has been appointed to be also Permanent Head, for the purposes of the *Public Service Act*, 1902, of New South Wales.

Diary for the Month.

AUG. 22.—New South Wales Branch, B.M.A.: Ethics Committee.
AUG. 23.—Victorian Branch, B.M.A.: Council Meeting.
AUG. 24.—New South Wales Branch, B.M.A.: Clinical Meeting.
AUG. 25.—Queensland Branch, B.M.A.: Council Meeting.
AUG. 31.—New South Wales Branch, B.M.A.: Branch Meeting.
AUG. 31.—South Australian Branch, B.M.A.: Branch Meeting, E. C. Stirling Lecture.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Medical Secretary, 135 Macquarie Street, Sydney)—All contract practice appointments in New South Wales.

Victorian Branch (Honorary Secretary, Medical Society Hall, East Melbourne): Associated Medical Services Limited; all Institutes or Medical Dispensaries; Australian Prudential Association, Proprietary, Limited; Federal Mutual Medical Benefit Society; Mutual National Provident Club; National Provident Association; Hospital or other appointments outside Victoria.

Queensland Branch (Honorary Secretary, B.M.A. House, 225 Wickham Terrace, Brisbane, B17): Brisbane Associated Friendly Societies' Medical Institute; Bundaberg Medical Institute. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 178 North Terrace, Adelaide): All Lodge appointments in South Australia; all Contract Practice appointments in South Australia.

Western Australian Branch (Honorary Secretary, 205 Saint George's Terrace, Perth): Norseman Hospital; all Contract Practice appointments in Western Australia. All government appointments with the exception of those of the Department of Public Health.

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